ENERGY ENGINEERING ANALYSIS PROGRAM STUDY REPORT

EXECUTIVE SUMMARY
FINAL REPORT

MILAN ARMY AMMUNITION PLANT
MILAN, TENNESSEE

MOBILE DISTRICT
CORPS OF ENGINEERS

CONTRACT DACA01-80-C-0097
SEPTEMBER, 1982

DAY & ZIMMERMANN, INC.

DEPARTMENT OF THE ARMY
CONSTRUCTION ENGINEERING RESEARCH LABORATORIES, CORPS OF ENGINEERS
P.O. BOX 9005
CHAMPAIGN, ILLINOIS 61826-9005

REPLY TO
ATTENTION OF: TR-I Library

17 Sep 1997

Based on SOW, these Energy Studies are unclassified/unlimited.
Distribution A. Approved for public release.

Marie Wakefield,
Librarian Engineering

EXECUTIVE SUMMARY

This is a summary of the Energy Engineering Analysis for the Milan Army Ammunition Plant (MAAP) in Milan, Tennessee. It includes the recommendations for the development of a Basewide Energy Plan consisting of energy conservation projects and other recommendations for reduction of the installation's 1985 source energy consumption.

Milan Army Ammunition Plant, containing 22,541 acres, is situated in both Gibson and Carroll Counties, Tennessee, and is approximately equally divided longitudinally into the two counties. Milan, Tennessee, is 5 miles west and has a population of 8,100; Humboldt is 17 miles southwest with a population of 10,200; Trenton is 18 miles northwest with a population of 4,600; and Jackson is 28 miles south with a population of 49,100. The Mississippi River is approximately 55 miles west of the plant, the Tennessee River 45 miles east.

Milan Army Ammunition Plant and the surrounding area is gently rolling terrain. The elevation of the plant varies from a high of approximately 590 feet on the south side, to a low of approximately 320 feet on the north boundary of the reservation. The Milan area experiences typically short mild winters and long warm summers. With the exception of a few modernized facilities, the overwhelming majority of buildings at MAAP were constructed for World War II ammunition production.

This Energy Engineering Analysis summary presents data on:

- Historical and predicted energy consumption
- Energy conservation procedures for distribution systems
- Energy conservation procedures for buildings and processes
- Utilization of energy monitoring and control systems (EMCS)
- Utilization of wood biomass
- Conservation procedures under higher levels of mobilization

The conservation of energy in existing facilities can be accomplished in two basic ways:

- Reduce the basic system energy requirements and source energy use
- Recover energy discharged from one user and utilize this waste energy for other purposes

A reduction in source energy requirements is represented by such activities as lowering equipment operating temperatures, reduction of transmission losses by better insulation, and night/weekend setback or shutdown of energy users and associated distribution systems.

Recovery of energy discharged by one user and utilization of this waste energy for other purposes is demonstrated by such activities as returning condensate to boiler systems and recovery of heat from process exhaust air systems to preheat replacement air. Examples of energy below the level of practical utilization are exhaust flue gases from boilers (cooled to near the dew point), and air exhausted from buildings near ambient temperature conditions.

This study has been directed towards identifying means of energy conservation conforming to those two methods identified as reduction in overall use and recovery of waste energy. Although the above discussion may appear to be confined to heat energy, investigations covered electrical usage, water usage, compressed air, wood biomass and solar energy.

The number and type of viable ECAM projects has been restricted by direction of the COE, Mobile to those which qualify at the 1980 level of mobilization (approximately 15%) and which exceed a Capital Cost Value of $100,000. The total energy savings presented in this report can be obtained only upon full implementation of the viable ECAM projects and compliance with the recommended conservation measures requiring capital investments less than $100,000. Those measures requiring policy changes at the management level, will result in additional savings.

Computer simulations of building energy use were modeled using the DOE-2.1 program. Computer simulations for energy utilization were performed on typical building types. Categorizing and prototyping methodology followed procedures outlined in the Black & Veatch Study "Engineering Instructions for Preparation of a Basewide Energy Systems Plan", dated January 1980. After careful examination of the MAAP facilities during field surveys, taking into consideration the building construction, building functions, and plant operating procedures, a total of 17 typical buildings were computer modeled to determine their energy use, both thermal and electrical, and to verify recorded historical energy consumption figures during the base year 1975. The final

analysis resulted in a correlation which was within 3 percent of recorded consumption figures.

Energy conservation projects were generated from the energy model for conservation measures involving building insulation, reduction in fenestration area, temperature controls installation, relighting with energy-efficient fixtures, and a basewide EMCS. A detailed analysis is provided in the main report.

The following is a tabulation of the MAAP source energy consumption for the fiscal years 1975 and 1980.

Source	1975	1980
Electricity	218,751 x 10^6 BTU	126,226 x 10^6 BTU
Fuel Oil No. 2 & 6	245,205 x 10^6 BTU	107,153 x 10^6 BTU
Coal	255,115 x 10^6 BTU	124,841 x 10^6 BTU

This yields a total of 358,220 Mega BTU's for FY-80 (see Figure 1) as compared to a total of 718,891 Mega BTU's for FY-75. It is reported that operations during this period had decreased from an average level of 37% mobilization in FY 1975 to an average level of 15% mobilization in FY-1980.

Figure 2 shows the historical and predicted annual energy consumption for a ten-year period through fiscal year 1986, reflecting the effect of proposed conservation measures.

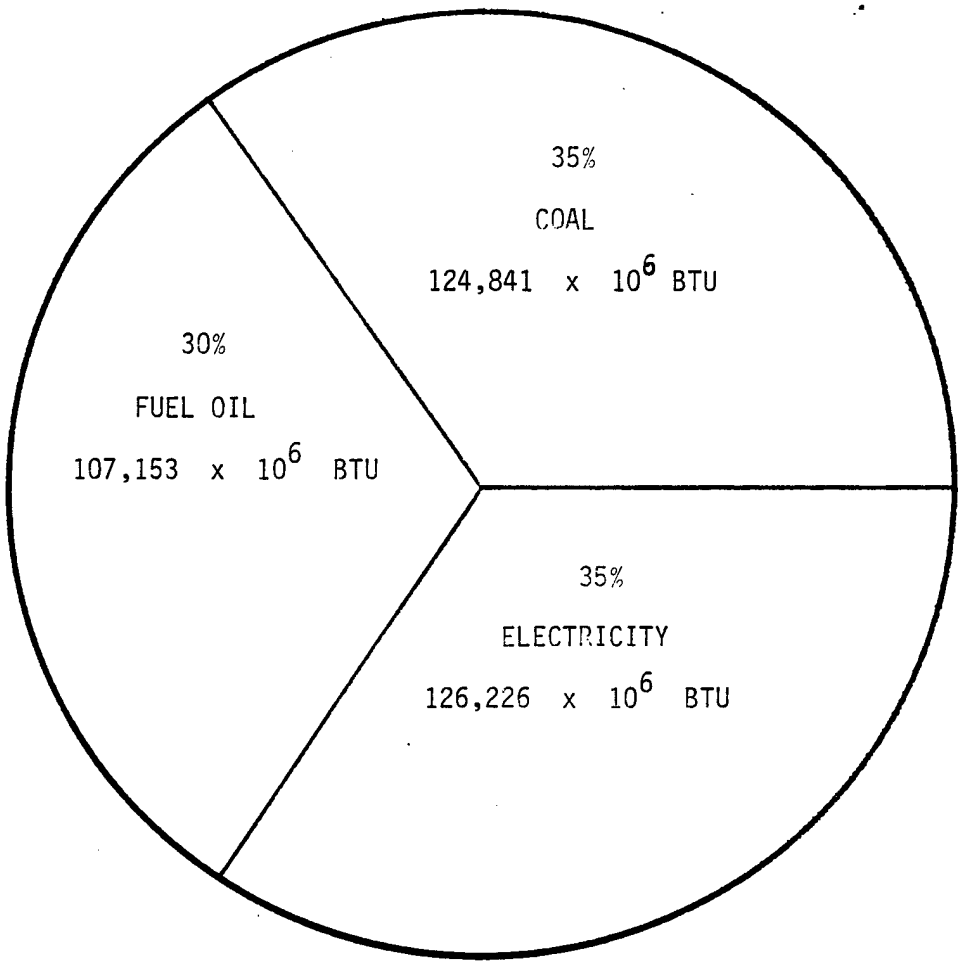


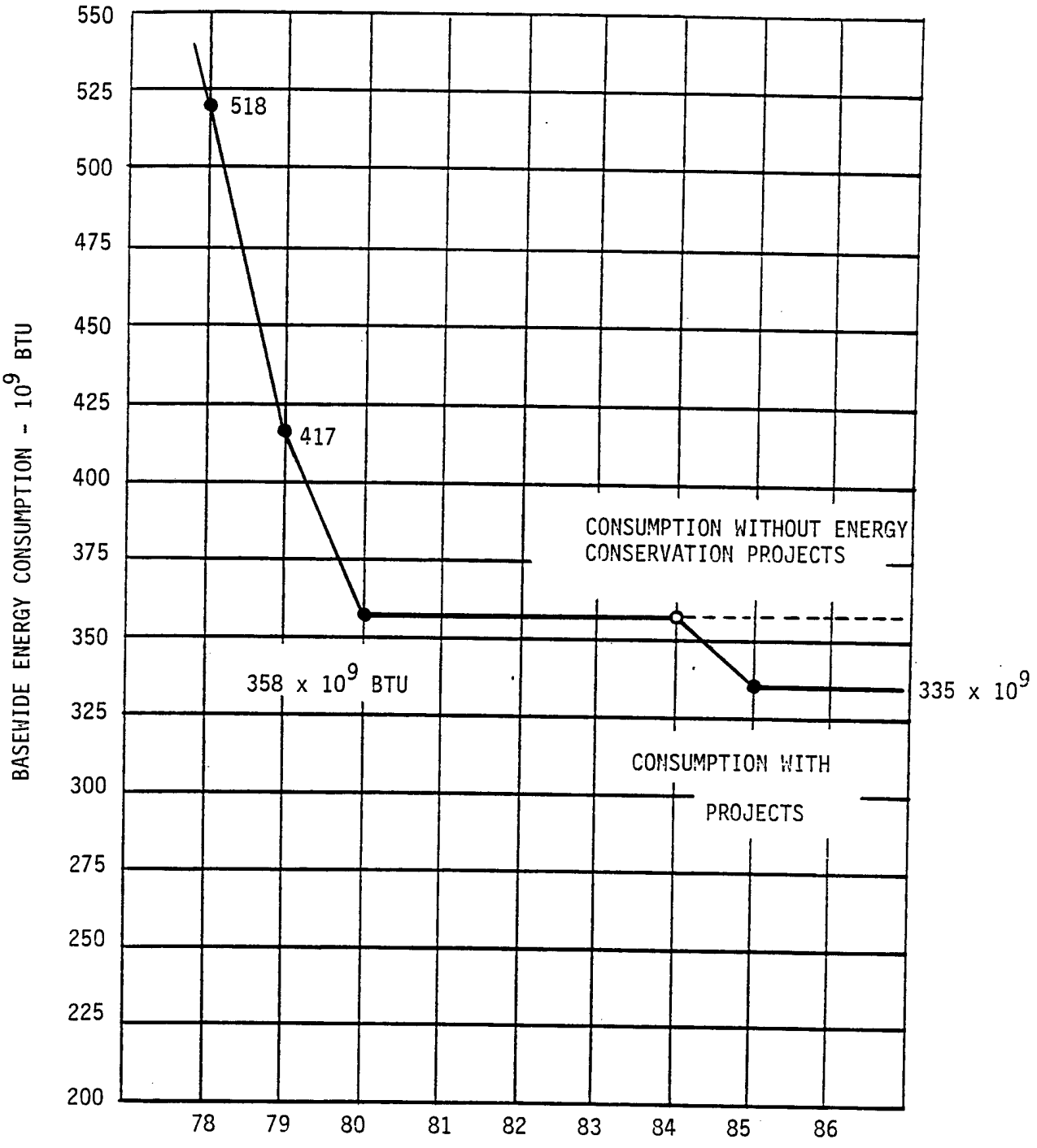
FIGURE 1

BASEWIDE CONSUMPTION FY '80

(358,220 x 10^6 BTU)

PROJECTED ENERGY CONSUMPTION

MILAN AAP



It was determined that the fuel consumption rate for this facility is almost totally weather-dependent. Since less than 1% of the steam generated in the boilers is consumed in process operations, the remainder is therefore consumed in building heating and transmission line losses getting the steam to the buildings. Figure 3 shows the monthly fuel consumption for fiscal year 1980. Note the peak during the cold winter months as compared to the low level of consumption during the summer.

Figure 4 shows the basewide electrical consumption for the past three fiscal years. It can be seen that the January peaks have steadily declined, while the average yearly consumption remains relatively constant around 11 million kilowatt hours. It is apparent the peaks have been reduced as a result of an Executive Order prohibiting supplemental electrical heating units where a building already contains a main source of heat.

The projected basewide energy costs through fiscal year 1986 are shown on Figure 5. Projections are made for the facility if left in its present condition and level of utilization based on FY-80 consumption rate. Predicted costs resulting from the anticipated energy savings upon implementation of all energy conservation projects and recommendations in FY-85 are shown by the solid line graph. The following escalation rates were used for calculation purposes:

Fuel Oil:	1.14 (14%)
Coal:	1.10 (10%)
Electricity:	1.13 (13%)

FUEL CONSUMPTION FY-80

MILAN AAP

FISCAL YEAR 1980

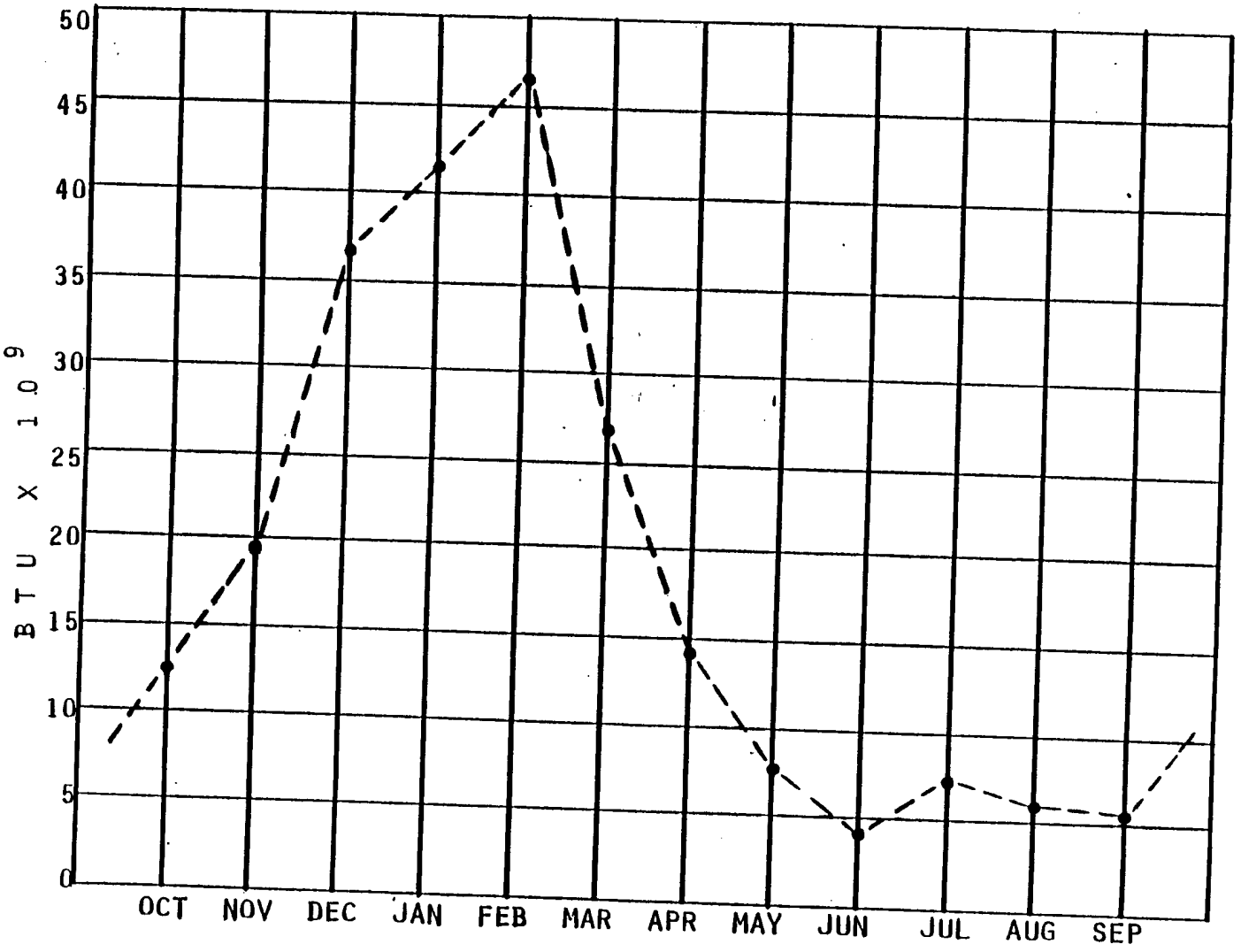


FIGURE 3

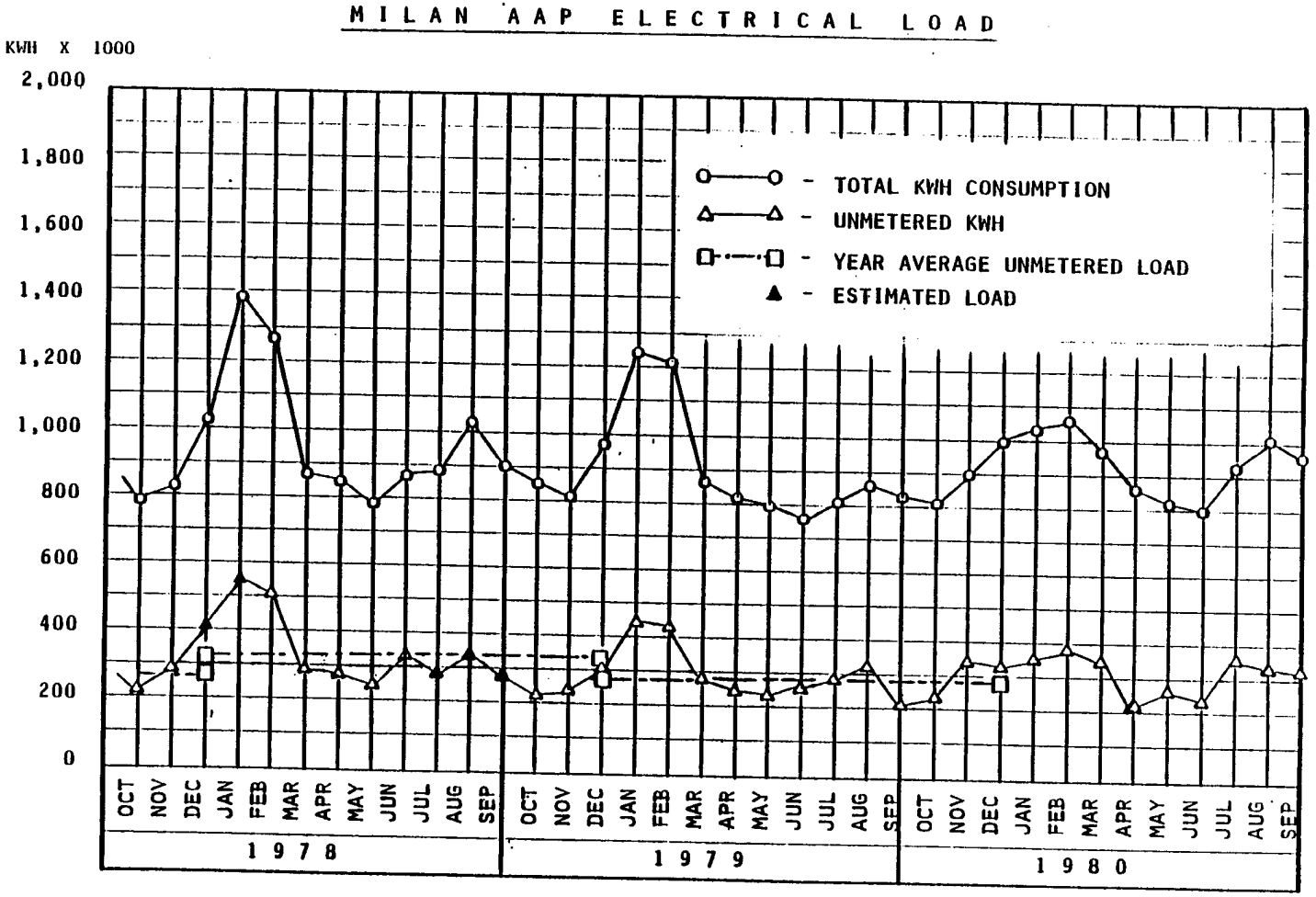

MILAN AAP ELECTRICAL LOAD
KWH X 1000
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
TOTAL KWH CONSUMPTION
UNMETERED KWH
YEAR AVERAGE UNMETERED LOAD
ESTIMATED LOAD
OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP
1978
OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP
1979
OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP
1980

FIGURE 4

PROJECTED ENERGY COSTS

MILAN AAP

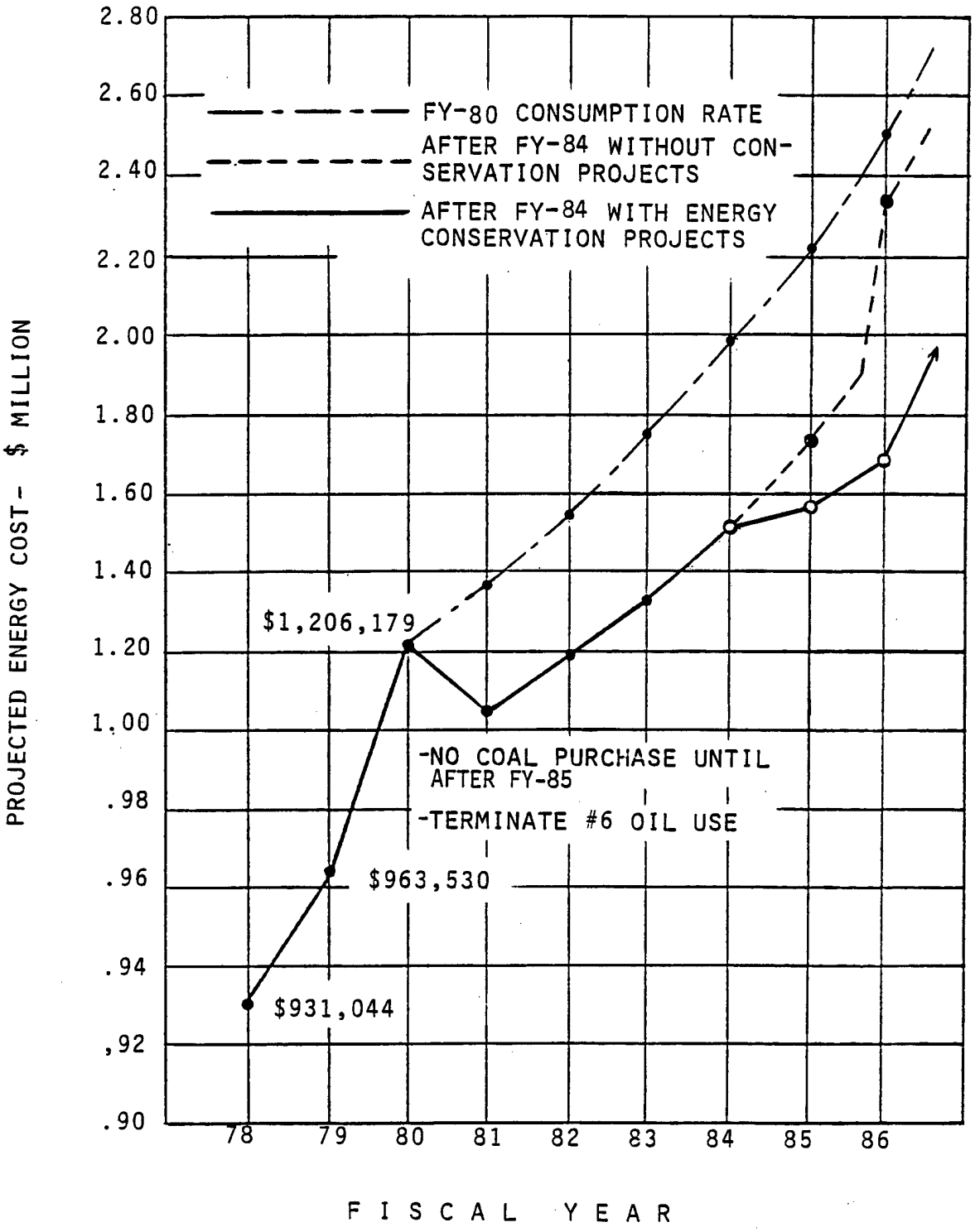


FIGURE 5

A total of 3.2% or 11,500 Mega BTU can be saved annually upon implementation of the viable ECAM projects determined by this study. Figure 6 shows the total source energy reduction. Further breakdown of the total savings yields the following:

Fuel Oil	$7,520 \times 10^6$ BTU saved
Coal	$2,800 \times 10^6$ BTU saved
Electricity	$1,200 \times 10^6$ BTU saved

An additional 10,600 Mega BTU, or 2.9% savings in basewide coal consumption can be achieved by implementation of recommended energy conservation projects which do not qualify for ECAM funding. (See Appendix A of this summary).

ECAM Projects for source energy reduction are listed in Table 1 with their corresponding E/C ratio. Table 2 contains projects not qualifying for ECAM funding, i.e., requiring less than $100,000 capital expenditure, but which are good energy-saving measures.

Further explanation of the historical energy consumption, basewide energy model, and energy conservation analysis can be found in the Energy Use Survey, Section 3 of this report. The analysis for temperature control schemes and basewide EMCS applications is included in the report on Energy Monitoring and Control Systems, Section 4 of this report.

BASEWIDE CONSUMPTION AFTER FY-85 ENERGY CONSERVATION PROJECTS

CURRENT (FY-80) CONSUMPTION = 358,000 x 10^6 BTU

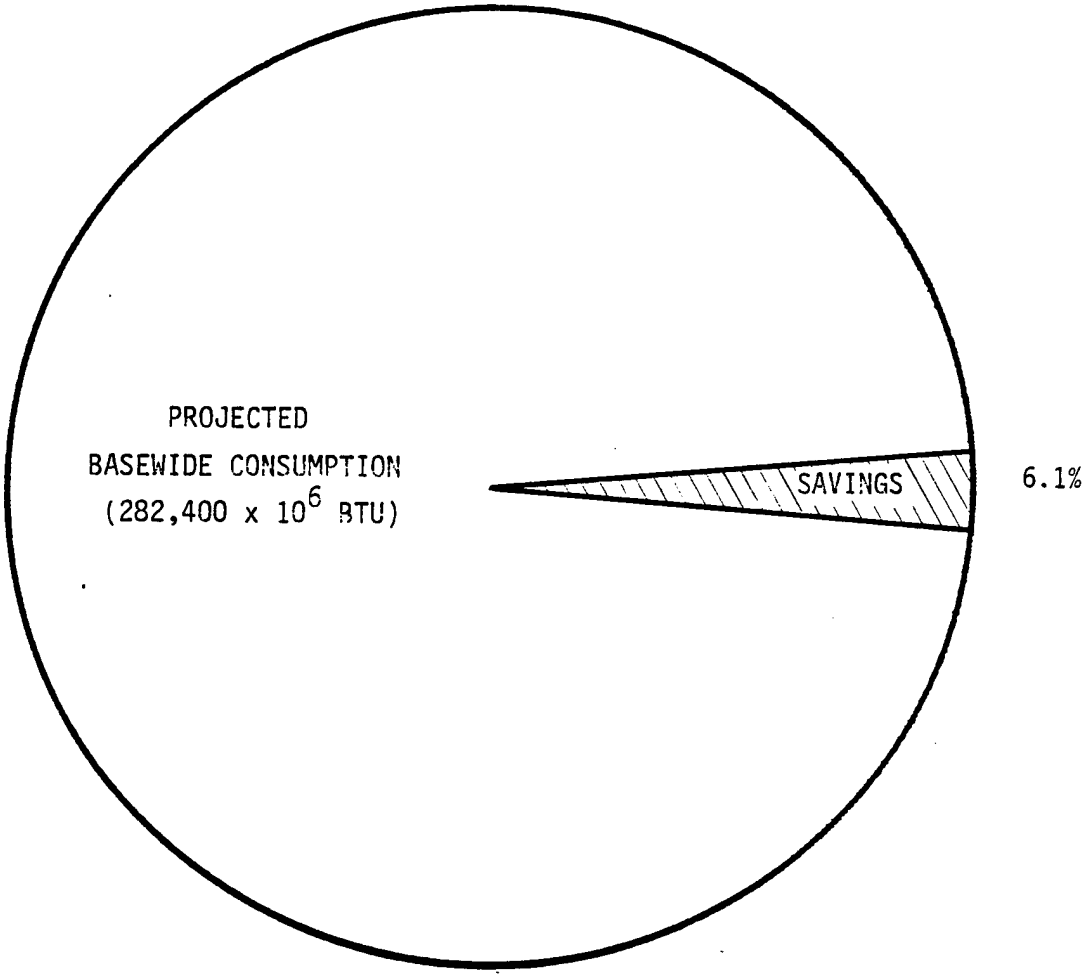


FIGURE 6

ECAM PROJECT SUMMARY

MILAN ARMY AMMUNITION PLANT

PROJECT NO.	PROJECT TITLE	BUILDINGS	CAPITAL $ COST $	ENERGY SAVED - MEGA BTU ELEC.	OIL	COAL	TOTAL	B/C	E/C	PB YEARS
M-101	Insulation: B Line	(7)	406,400	(-) 70	3230	-	3300	3.2	8.5	5.7
M-102	Insulation: X-Line	(11)	482,900	2.0	3241	-	3243	2.6	7.0	6.8
M-103	Insulation: D-Line, H-Line, O-Line & J Area	(12)	460,400	8.8	-	3662	3750	0.9	8.6	14.9
M-104	Temp. Controls	(92)	198,500	1211	7526	2796	11533	11.3	60.9	1.0
M-105	Basewide EMCS	(68)	889,200	1286	7289	2796	11371	2.15	13.3	5.8

NOTE: 1. Projects M-101, M-102 and M-103 do not qualify for ECAM funding.

2. Projects M-104 and M-105 are similar. One or the other may be chosen for programming.

TABLE 1

TABLE 2

ENERGY CONSERVATION PROJECTS

UNDER $100,000

PROJECT TITLE	ANNUAL ENERGY SAVINGS	COST 1984
Replace (10) Expansion Fittings in Steam Distribution System	390×10^6 BTU	$28,200
Replace U/G District Steam Piping - Line "D"	6580×10^6 BTU	$55,000
Replace U/G District Steam Piping - Line "H"	3630×10^6 BTU	$71,400

Total Annual Savings = 10,600 Mega Btu

The composite total in energy reduction for building improvement projects is not a simple algebraic summation of individual project's energy savings. Due to synergistic effects, the average composite total savings are approximately 63% of the simple sum. Consideration must be given to these synergistic effects when arriving at energy savings using different combinations of energy conservation projects.

The addition of simple temperature controls (Project M-104) or the installation of a basewide EMCS (Project M-105) essentially accounts for the same block of energy to be saved. One or the other may be chosen, and thus the energy savings can only be taken credit for one time. Although the initial cost is greater to install the EMCS, it does have a decided advantage over the simpler temperature controls arrangement due to its inherent ability to monitor and report out of state operating conditions. This discourages tampering by personnel and ultimately guarantees energy savings, provided the system is properly installed and maintained. The total basewide energy reduction figure quoted includes the savings resulting from Temperature Controls installation.

A detailed study of the utilization of Biomass material from the 21,800 acre Milan Site as an energy source was conducted. This study indicated that it would take 20 to 25 years to develop woodlands capable of maintaining a reasonably uniform level of Biomass material.

At present, wood biomass would be a more expensive fuel than coal or oil at Milan AAP. Due to the high moisture content of wood and handling expenses, the cost of burning wood grown on site would be about 1.7 times that of coal per useful BTU equivalent.

However, since there is a growing market for pulp wood in this location, it appears desirable to plant loblolly pine in several suitable areas in rotation during the coming years. The harvesting of this pine would begin after 20 to 25 years, and depending upon conditions existing at that time, be utilized in one of three ways. The wood may be burned as fuel at Milan AAP, sold to pulp mills, or burn the low quality wood at Milan and sell the high quality wood to pulp mills. Accordingly, it is desirable that some of the boilers which may be installed in the coming years be capable of conversion to burning wood, with minimum adaption, in the future. Companies in the vicinity of Milan which generate waste wood materials all have existing markets for their materials. A detailed analysis is included in the Biomass Survey, Section 5 of this report.

Based on instructions received at the 40% review meeting on June 17, 1981, this report was directed to cover only the currently operational lines B, D, H, X, I and K-10 and areas K, Q, J and T on their present operating schedules, approximately 15% mobilization.

Field surveys, hand calculations and computer calculations had initially been prepared for the entire base assuming 100% mobilization on a 5-8-3 shift operation, according to the initial scope of work. It was subsequently agreed that the basewide energy use model derived in this manner could be scaled down to current mobilization levels without re-running the DOE 2.1 computer anlaysis, by developing factors using manual calculation methods. These factors were then applied to the computer generated energy figures to obtain current building energy requirements and ECAM project savings.

It is suggested that the supporting documentation of this report be reviewed if mobilization levels are increased or operating areas changed, to determine if potentially viable projects for energy conservation may exist in these other production lines or areas. Examples include relighting for interconnecting walkways and consolidation of the compressed air systems, which promise economically attractive energy savings during periods of maximum mobilization.

The Basewide Energy Plan Recommendations for the Milan Army Ammunition Plant are presented in Section 6 of this report. Copies of ECAM Projects generated as a result of this energy Engineering Analysis are included in Volume 1 under Section 7.

APPENDIX A

A-1 IMPLEMENTATION OF AN EXPANDED MAINTENANCE PROGRAM

The following energy conservation and/or control projects are discussed in the report as viable projects under an expanded maintenance program.

1. Addition of water preheat coils in laundry waste water sump.
2. Control changes in building H-115 to utilize outside air for makeup under certain temperature conditions.
3. Replacement of malfunctioning or disconnected steam traps.
4. Repair of pipe hangers and supports to align pipe.
5. Repair of damaged pipe insulation.
6. Repair or replacement of leaking valves.
7. Initiate program to locate and repair compressed air, steam, condensate, water and sewer line leaks.
8. Interconnect compressed air systems.
9. Renegotiate electric demand rates.
10. Adjust fuel inventory.
11. Install oil and steam flow meters on operating lines.
12. Install electric meters on all operational substations.
13. Install run-off water control and treatment at coal storage area.
14. Add coal fired boilers to reduce oil consumption.
15. Add uninterruptable power supplies to all microprocessor or computer facilities.
16. Add emergency generators where total power failure could cause a hazardous situation.

A-2 POTENTIAL CONSERVATION MEASURES REQUIRING CAPITAL INVESTMENT

	Project Studied	Comments
1.	Install vestibules around high traffic doors.	This project has limited application. The calculations are subject to numerous assumptions.
2.	Install solar shading devices: . Solar Film . Solar Screens . Overhangs . Awnings	This project has limited application.
3.	Install attic ventilation fans.	This project has limited application to the Administration Bldg. and would likely disrupt the performance of window air conditioners.
4.	Install whole-house attic fans.	The savings are too occupant-dependent.
5.	Reset outside air dampers to minimum requirements of ASHRAE 62-73.	This project has limited application.
6.	Install boiler economizers, oxygen trim controls, blowdown heat reclaim devices, etc.	Not cost effective for heating boilers due to short duty cycle.
7.	Install storm windows.	This project has limited further applications.
8.	Weatherstrip doors.	Good Project.
9.	Add floor, ceiling, and wall insulation.	This is a good project where there is no insulation present, however, short heating cycles prevent meeting ECAM criteria.
10.	Install setback/setup controls.	Good Project.
11.	Add warmup cycle with fresh air dampers closed where setback/ setup controls are used.	Good Project.

A-2 POTENTIAL CONSERVATION MEASURES REQUIRING CAPITAL INVESTMENT
(Continued)

	Project Studied	Comments
12.	Install flue dampers, smaller jets, dual burners, electronic ignition, etc. in small furnaces.	Not cost effective for heating boilers due to short duty cycle.
13.	Replace manual control valves or install temperature regulators in cast-iron radiators.	Not cost effective where thermostatic controls are being provided.
14.	Replace existing coal boilers with gas/oil conversion kits with modern packaged boilers.	This project does not meet the criteria.
15.	Replace incandescent lighting with higher efficiency lighting systems.	Good Project.
16.	Install photocell lighting controls.	This project has limited application.
17.	Replace existing motors with motors of the high efficiency type.	Limited application due to short duty cycles on current level of mobilization.
18.	Reduce lighting levels to minimum standards.	Limited application - most facilities are below minimum standards.
19.	Install water closet tank inserts, flow reducing shower heads, or other water conserving devices to reduce pumping energy consumption.	Limited Application.
20.	Insulate existing steam lines.	This project does not meet the criteria in most areas due to short duty cycle.
21.	Revise existing chilled water/ hot water pumping schemes to more efficient methods.	N/A

A-2 POTENTIAL CONSERVATION MEASURES REQUIRING CAPITAL INVESTMENT
(Continued)

	Project Studied	Comments
22.	Deactivate individual room thermostats in barracks and install temperature reset controls on chilled and hot water.	N/A.
23.	Shut down steam plants in the summer and satisfy process steam needs with electric boilers.	N/A.
24.	Install infrared heating in warehouses and shops.	This project does not meet the criteria due to short heating duty cycles.
25.	Install economizer systems for "free cooling" in intermediate seasons.	This project does not meet the criteria in retrofit applications.
26.	Modify multizone systems to include hot/cold deck reset.	N/A.
27.	Modify cooling tower systems to cycle fan with load and/or install bypass valving.	N/A.
28.	Install load-shedding system to minimize demand charges.	N/A.
29.	Correct power factor.	This project does not meet the criteria.
30.	Install chilled and hot water reset controls.	N/A.
31.	Install FM radio control system.	N/A.
32.	Replace existing windows with insulating panels.	Good Project - Limited application.
33.	Insulate temporary buildings.	N/A.

A-2 POTENTIAL CONSERVATION MEASURES REQUIRING CAPITAL INVESTMENT
(Continued)

	Project Studied	Comments
34.	Upgrade electrical distribution voltage.	N/A.
35.	Install total or selective energy plants.	N/A.
36.	Install energy monitoring and control system.	Good Project.
37.	Install heat reclaim devices on air-cooled condensers.	Limited application.
38.	Replace remotely located absorption chillers with more efficient electric-driven chillers.	N/A.
39.	Install solid waste-burning boilers.	This project does not meet the criteria.
40.	Install trailer enclosing devices at loading docks.	This project has limited application.
41.	Install solar energy systems where feasible.	This project does not meet the criteria.
42.	Install air-to-air heat reclaim devices in high exhaust areas, such as messhall kitchens.	This project does not meet the criteria.

A-3 POTENTIAL CONSERVATION MEASURES REQUIRING POLICY CHANGES AT INSTALLATION LEVEL

	Project Studied	Comments
1.	Replace domestic water heaters with higher efficiency models as replacement is required.	Good Project.
2.	Shut down steam boilers and branch lines in summer.	Currently practiced.
3.	Reduce domestic hot water temperatures from 140 F to 110-120 F.	Good Project.
4.	Replace electric motors with motors of the high efficiency type on replacement basis.	Good Project. Limited application due to motor frame sizes of older equipment.
5.	Use task lighting.	Good Project.
6.	Install temporary 4-mil plastic storm windows.	Limited application due to short heating cycle.
7.	Shut down HVAC and DHW systems in unoccupied buildings.	Good Project.
8.	Calk cracks on self-help basis.	Good Project.
9.	Install high-efficiency transformers on replacement basis.	Good Project.
10.	Enforce indoor space temperature regulations.	Currently practiced.
11.	Repair steam and condensate leaks.	Good Project.
12.	Repair air leakage in ducts.	N/A.
13.	Turn pilot lights for heating equipment off for the summer.	Good project - Limited application.
14.	Replace air-conditioning units with high efficiency models as replacement is required.	Good Project.

APPENDIX B

B-1 TYPICAL BUILDING DATA

This appendix includes summaries of building data as collected and analyzed by the computer program.

Table 1 - Lists the category code and buildings selected as prototypes for computer calculations

Table 2 - Lists the prototype buildings and their source energy consumption @ 100% mobilization.

Table 3 - Lists infiltration rates used for the computer analysis under different insulation conditions.

TABLE I

Prototype/Computer Simulated			
Category Code	MAAP Bldg. No.	Function	Similar Buildings
A-1-E	T-1	Admin.	T-2, 10; D-44, F-50
A-1-E	T-114	Computer Bldg.	None
A-1-F D-1-F CH-1-F	X-20	Admin., Cafe, Change House	B-20; D-11; H-12; The following buildings are similar to A/C zone of X-20 only: I-23; J-10; O-15
CH-1-F	X-21	Change House, Boiler Plant	B-21; J-2, 3, 5, 8, 52, 106, 111, 123; V-101 thru 104, V-201 thru 204
D-1-E	T-113	Cafeteria	The following Bldgs. are similar to A/C zone of T-113 only: H-111, 115; J-124, 135; V-20, 21
FH-1-E	Q-23	Family Housing	Q-1 thru Q-22, Q-24 thru Q-32
M-1-E	I-3	Vehicle Repair	I-4, 5, 6, 7, 9, 40, 154; J-9; K-301, 312, 315
M-1-F	C-6	Production	J-129, 130; V-22 thru 26
M-1-F	X-4	Pelletizing	I-4
M-1-F	X-8	Assembly (Production)	H-81
M-1-F	X-12	Assembly (Production)	B-12; O-1, 3, 4
M-1-F	X-14	Assembly (Production)	B-14; D-3
M-1-F	X-18	Assembly (Production)	B-18
M-1-F	X-27	Assembly (Production)	None
M-1-F	X-41	Melt-Pour (Production)	O-14 (heated only portion of X-41)
W-1-F	X-2	Storage	None
W-1-F	X-33	Inert Storage	B-10, 15, 16, 19, 261; H-3, 5; X-7, 10, 17, 19

TABLE 2
TYPICAL BUILDING ENERGY CONSUMPTION DATA
MAAP

GROUP NO.	BLDG.	BUILDING DESCRIPTION	ANNUAL ENERGY SOURCE CONSUMPTION BTU x 10^6				ELEC. ENERGY CONSUMPTION		BTU x 10^6 / SQ. FT./YR
			FUEL		ELEC.	TOTAL	KW PEAK	KWH/YEAR	
			COAL	OIL					
A-I-E	T-1	Administration	--	2675.4	5752.8	8428.2	264.5	495,931	0.167
A-I-E	T-114	Computer Bldg.	--	113.8	1459.8	1573.6	38.0	125,845	0.273
A-I-F CH-I-F D-I-F	X-20	Change House, Cafeteria, Off.	--	2831.3	1099.3	3930.6	72.0	94,767	0.254
CH-I-F	X-21	Change House, Boiler Plant	--	1522.8	145.0	1667.8	18.5	12,500	0.122
D-I-E	T-113	Cafeteria	--	657.4	1083.3	1740.7	49.2	93,388	0.143
FH-I-E	Q-23	Family Housing	--	149.3	132.6	281.9	3.2	11,431	0.118
M-I-E	I-3	Vehicle Repair	--	2429.5	1108.5	3538.0	37.5	95,560	0.117
M-I-F	CC-6	Production	--	502.1	267.1	769.2	9.0	23,026	0.078
M-I-F	X-4	Pelletizing	--	875.2	323.9	1199.1	11.6	27,922	0.248
M-I-F	X-8	Assembly (Production)	--	1182.0	419.1	1601.1	15.0	36,129	0.244
M-I-F	X-12	Assembly (Production)	--	1683.9	477.3	2161.2	17.1	41,147	0.281
M-I-F	X-14	Assembly (Production)	--	2699.8	1210.0	3909.8	40.9	104,310	0.195
M-I-F	X-18	Assembly (Production)	--	3355.9	855.0	4210.9	30.6	73,707	0.248

Table 2 Continued

GROUP NO.	BLDG.	BUILDING DESCRIPTION	ANNUAL ENERGY SOURCE CONSUMPTION BTU x 10^6				ELEC. ENERGY CONSUMPTION		BTU x 10^6/ SQ. FT./YR.
			FUEL		ELEC.	TOTAL	KW PEAK	KWH/YEAR	
			COAL	OIL					
M-I-F	X-27	Assembly (Production)	--	1154.4	360.5	1514.9	12.9	31,078	0.215
M-I-F	X-41	Melt-Pour (Production)	--	3154.3	1380.6	4534.9	91.6	119,017	0.261
W-I-F	X-2	Storage	--	492.5	118.6	611.1	4.0	10,224	0.255
W-I-F	X-33	Inert Storage	--	2435.8	282.9	2718.7	9.6	24,388	0.245

MILAN AAP

AIR CHANGE RATES USED FOR INFILTRATION

BLDG. NO	AS IS	INSUL. ROOF	INSUL. WALLS	REDUCE GLASS
X-2	5	4.5	4	4.5
X-4	7	6.5	5	6.5
X-8	5	4.5	4	4.5
X-12	5	4.5	4	4.5
X-14	5	4.5	4	4.5
X-18	5	4.5	4	4.5
X-20	4	3.5	3	3.5
X-21	4	3.5	3	3.5
X-27	5	4.5	4	4.5
X-33	4	3.5	3	3.5
X-41	4	-	-	-

TABLE 3

B-2 BUILDING ENERGY SUMMARY

This appendix lists the energy requirements for all heated/cooled buildings at MAAP, for 100% mobilization and 15% mobilization levels.

The energy requirements reported in the 100% table represent energy requirements that would result if operations were scheduled around the clock with all lines operating.

The 15% tables reflect the application of scaling factors derived considering single shift operation of production lines and the current practice of Milan operating personnel of shutting down boilers when the ambient air temperature is expected to remain reasonably above freezing during non-working hours.

				PROTOTYPE	BLDG.	MAAP ENERGY	CONSUMP.	DATA				
				AS IS	100	PER CENT	MOBIL.					
GROUP NO.	BLDG. NO.	BLDG. DESCRIP.	BLDG. SQ. FT.	BLDG. ANNUAL FUEL OIL	ANNUAL A/C ELEC.	ENERGY MBTU LTG. ELEC.	CONSUMP. TOTAL OIL+ELEC.	BLDG. KW PEAK	ELEC. A/C KWH/YR	ENERGY LTG. KWH/YR	CONSUMP. TOTAL KWH/YR	TOTAL MBTU/ SQ.FT./YR
A-I-E	T-1	ADMIN	50481	2370.20	1948.75	8512.98	12831.94	264.50	167996	733878	901874	.25419343
A-I-E	T-114	COMPUTER	5760	113.80	273.90	1185.98	1573.68	38.00	23612	102240	125852	.27320889
A-I-F		OFFICE										
CH-I-F	X-20	CHG HOUSE	15500	2597.50	714.88	1075.67	4388.05	72.00	61628	92730	154358	.28310018
D-I-F		CAFE										
CH-I-F	X-21	CHG HOUSE	13700	1397.10	0.00	345.23	1742.33	18.50	0	29761	29761	.12717720
		BOILER										
D-I-E	T-113	CAFE	12184	644.70	382.19	1485.57	2512.45	49.20	32947	128066	161013	.20620903
FH-I-E	Q-23	FAMILY	2400	149.40	0.00	117.39	266.79	1.50	0	10120	10120	.11116333
		HOUSING										
M-I-E	I-3	VEHICLE	20040	2228.90	0.00	2640.59	4869.49	37.50	0	227637	227637	.24298848
		REPAIR										
M-I-F	C-6	PRODUC.	9814	460.60	0.00	635.98	1096.58	9.00	0	54826	54826	.11173646
M-I-F	X-4	PELLETIZ.	4830	810.40	0.00	578.35	1388.75	11.60	0	49858	49858	.28752646
M-I-F	X-8	ASSEMBLY	6550	1094.50	0.00	748.36	1842.86	15.00	0	64514	64514	.28135304
M-I-F	X-12	ASSEMBLY	7696	1559.20	0.00	852.44	2411.64	17.10	0	73486	73486	.31336247
M-I-F	X-14	ASSEMBLY	20050	2476.90	0.00	2881.00	5357.90	40.90	0	248362	248362	.26722689
M-I-F	X-18	ASSEMBLY	17000	3107.30	0.00	1526.71	4634.01	30.60	0	131613	131613	.27258887
M-I-F	X-27	ASSEMBLY	7050	1069.00	0.00	643.70	1712.70	12.90	0	55491	55491	.24293555
M-I-F	X-41	MELT POUR	17408	2894.00	193.73	3093.35	6181.08	91.60	16701	266668	266668	.35507125
W-I-F	X-2	STORAGE	2400	451.80	0.00	282.32	734.12	4.00	0	24338	24338	.30588367
W-I-F	X-33	INERT	11118	2234.70	0.00	673.48	2908.18	9.60	0	58059	58059	.26157442
		STORAGE										

MAAP ENERGY CONSUMP. DATA

ALL BLDG AS IS 100 PER CENT MOBIL. ALL LINES AND AREAS

AREA/LINE A/L	NUMBER OF BLDGS.	TOTAL BLDG. SQ. FT.	ANNUAL BLDG. FUEL OIL	ENERGY A/C ELEC.	ENERGY LTG. ELEC.	CONSUMP. A/C+LTG. ELEC.	MBTU TOTAL OIL+ELEC.	BLDG. ELEC. CONSUMP. A/C KWH/YR	BLDG. ELEC. CONSUMP. LTG. KWH/YR	ENERGY TOTAL KWH/YR	TOTAL MBTU/ SQ.FT./YR	HTG FUEL SOURCE
A LINE	16	108195	18151.13	714.88	8518.03	9232.92	27384.05	61628	734313	795941	.25309899	OIL
B LINE	13	100648	16125.29	714.88	8589.87	9304.75	25430.04	61628	740506	802134	.25266319	OIL
C LINE	23	135024	15890.45	1106.62	10224.40	11331.02	27221.47	95398	881414	976812	.20160467	OIL
D LINE	13	110300	19018.71	1101.05	1515.59	12616.64	31635.35	94918	992723	1087641	.28681	COAL
D AREA	1	4656	218.83	179.74	785.19	964.93	1183.76	15495	67689	83184	.25424	OIL
E LINE	8	29406	3880.16	796.97	2834.55	3631.52	7511.68	68704	244358	313062	.25544716	OIL
F LINE	16	53520	9254.25	558.08	3740.74	4298.82	13553.07	48110	32.478	370588	.25323376	OIL
F AREA	1	3190	149.93	123.15	537.96	661.11	811.04	10616	+6376	56992	.25424364	OIL
H LINE	8	31880	3728.69	1105.29	2388.66	3493.95	7222.64	95284	205919	301203	.2265572	AL
I LINE	7	7413	1281.91	0.00	822.07	822.07	2103.98	[illegible]	70868	70868	.28382285	OIL
I AREA	9	62686	6635.26	243.52	7847.56	8091.08	14726.34	20993	676514	697507	.23492 33	OIL
J AREA	13	94043	8501.31	464.38	5374.79	5839.17	14340.48	40033	463344	503377	.15248358	COAL
K AREA	4	25415	2889.47	55.34	3273.97	3329.32	6218.79	4771	282239	287010	.24468959	OIL
O LINE	4	15930	3086.63	191.63	1592.65	1784.28	4870.91	16520	137297	153817	.30576944	COAL
Q AREA	32	67400	4178.80	0.00	3297.01	3297.01	7475.81	0	284225	284225	.11091706	OIL
S AREA	2	15300	2065.50	352.83	723.68	1076.50	3142.00	30416	62386	92802	.20535969	OIL
T AREA	5	88655	4079.51	3385.82	14596.14	17981.96	22061.47	291881	1258288	1550169	.4884632	OIL
V LINE	15	38498	2334.03	363.85	2271.85	2635.69	4969.72	31366	195849	227215	.12909045	OIL
X LINE	20	135856	22617.73	908.62	13532.25	14490.87	37108.60	78329	1170884	1249213	.27314657	OIL
Z LINE	6	42916	4666.99	1016.76	3582.08	4598.84	9265.83	87652	308800	396452	.21590626	OIL
TOTALS	216	1170931	148754.58	13383.41	106099.05	119482.46	268237.04	1153742	9146470	10300212	.22908014	
OIL BLDG	179	918778	114419.24	10521.05	85227.37	95748.42	210167.66	906987	7347187	8254174	.22874694	
COAL BLDG	37	252153	34335.34	2862.36	20871.68	23734.04	58069.38	246755	1799283	2046038	.23029423	

ALL BLDG. MAAP CONSUMP, DATA

AS IS 100 PER CENT MOBIL, A&B LINES

PROTOTYPE BLDG.	BLDG. NO.	BLDG. SQ. FT.	BLDG. ANNUAL ENERGY CONSUMP. MBTU FUEL OIL	A/C ELEC,	LTG. ELEC,	A/C+LTG. ELEC,	TOTAL OIL+ELEC.	BLDG. ELEC. CONSUMP. A/C KWH/YR	LTG. KWH/YR	ENERGY TOTAL KWH/YR	TOTAL MBTU/ SQ.FT./YR
X-14	A-2	15083	1863.30	0.00	2167.29	2167.29	4030.59	0	186835	186835	.26722708
X-18	A-3	19260	3520.39	0.00	1729.68	1729.68	5250.07	0	149110	149110	.27258910
X-18	A-4	15881	2902.77	0.00	1426.22	1426.22	4328.99	0	122950	122950	.27258926
X-33	A-5	640	128.64	0.00	38.77	38.77	167.41	0	3342	3342	.26157375
X-33	A-6	640	128.64	0.00	38.77	38.77	167.41	0	3342	3342	.26157375
X-33	A-7	640	128.64	0.00	38.77	38.77	167.41	0	3342	3342	.26157375
X-33	A-8	640	128.64	0.00	38.77	38.77	167.41	0	3342	3342	.26157375
X-33	A-9	640	128.64	0.00	38.77	38.77	167.41	0	3342	3342	.26157375
X-20	A-14	15500	2597.50	714.88	1075.67	1790.55	4388.05	61628	92730	154358	.28310018
X-21	A-15	12820	1307.36	0.00	323.05	323.05	1630.41	0	27149	27847	.12717694
X-33	A-33	11118	2234.70	0.00	673.48	673.48	2908.18	0	58059	58059	.26157442
X-33	A-34	11118	2234.70	0.00	673.48	673.48	2908.18	0	58059	58059	.26157442
X-33	A-39	2571	516.77	0.00	155.74	155.74	672.51	0	13426	13426	.26157588
X-33	A-40	1044	209.84	0.00	63.24	63.24	273.08	0	5452	5452	.26157395
X-33	A-43	200	40.20	0.00	12.11	12.11	52.31	0	1044	1044	.261552
X-33	A-44	400	80.40	0.00	24.23	24.23	104.63	0	2089	2089	.261581
X-2	B-2	2436	458.58	0.00	286.55	286.55	745.13	0	24703	24703	.30588456
X-4	B-4	2798	469.46	0.00	335.04	335.04	804.50	0	28883	28883	.28752781
X-12	B-12	3296	667.77	0.00	365.08	365.08	1032.85	0	31472	31472	.31336323
X-14	B-14	23050	2847.51	0.00	3312.07	3312.07	6159.58	0	285523	285523	.26722676
X-33	B-15	54	10.85	0.00	3.27	3.27	14.12	0	282	282	.26150370
X-33	B-16	640	128.64	0.00	38.77	38.77	167.41	0	3342	3342	.26157375
X-18	B-18	15996	2923.79	0.00	1436.54	1436.54	4360.33	0	123840	123840	.27258902
X-20	B-20	15500	2597.50	714.88	1075.67	1790.55	4388.05	61628	92730	154358	.28310018
X-21	B-21	14050	1432.79	0.00	354.04	354.04	1786.83	0	30521	30521	.12717677
X-33	B-33	11118	2234.70	0.00	673.48	673.48	2908.18	0	58059	58059	.26157442
X-33	B-34	11118	2234.70	0.00	673.48	673.48	2908.18	0	58059	58059	.26157442
X-33	B-262	296	59.50	0.00	17.93	17.93	77.43	0	1546	1546	.2616
X-33	B-263	296	59.50	0.00	17.93	17.93	77.43	0	1546	1546	.2616
TOTALS	29	208843	34276.42	1429.77	17107.90	18537.67	52814.09	123256	1474819	1598075	.25288896

			ALL	BLDG.	MAAR ENERGY	CONSUMP.	DATA				
			AS IS	100	PER CENT	MOBIL.	C LINE				
PROTOTYPE BLDG.	BLDG. NO.	BLDG. SQ. FT.	BLDG. ANNUAL FUEL OIL	A/C ELEC.	ENERGY LTG. ELEC.	CONSUMP. A/C+LTG. ELEC.	MBTU TOTAL OIL+ELEC.	BLDG. A/C KWH/YR	ELEC. CONSUMP. LTG. KWH/YR	ENERGY TOTAL KWH/YR	TOTAL MBTU/ .FT./YR
C-6	C-1	2420	113.58	0.00	156.82	156.82	270.40	0	13519	13519	.11173477
C-6	C-3	17241	809.17	0.00	1117.28	1117.28	1926.45	0	96317	96317	.11173646
C-6	C-5	3380	158.63	0.00	219.04	219.04	377.67	0	18882	18882	.11173646
C-6	C-6	9814	460.60	0.00	635.98	635.98	1096.58	1	54826	54826	.11173646
X-33	C-9	640	128.64	0.00	38.77	38.77	167.41	0	3342	3342	.26157442
X-18	C-10	12050	2202.33	0.00	1082.17	1082.17	3284.70	0	93290	93290	.27258887
X-20	C-11	21458	3595.95	989.68	1489.14	2478.82	6074.76	85317	128374	213691	.28310018
C-6	C-[illegible]	10687	501.57	0.00	692.56	692.56	1194.13	0	59703	59703	.11173646
X-33	C-14	336	67.54	0.00	20.35	20.35	87.89	0	1755	1755	.26157442
C-6	C-19	1280	60.07	0.00	82.95	82.95	143.02	0	71[illegible]	7151	.11173646
X-33	C-21	244	49.04	0.00	14.78	14.78	63.82	0	1274	1274	.26157442
X-33	C-22	244	49.04	0.00	14.78	14.78	3.82	0	1274	[illegible]274	.26155082
X-33	C-23	244	49.04	0.00	14.78	14.78	63.82	0	1274	1274	.26155082
C-6	C-24	7140	335.10	0.00	462.70	462.70	797.80	0	39888	39888	.11173646
X-33	C-33	11118	2234.70	0.00	673.48	673.48	2908.18	0	58059	58059	.26157442
X-33	C-34	11118	2234.70	0.00	673.48	673.48	2908.18	0	58059	58059	.26157442
C-6	C-41	11708	549.49	0.00	758.72	758.72	1308.21	0	65407	65407	.11173646
X-41	C-42	10508	1746.91	116.94	1867.24	1984.18	3731.09	10081	160969	171050	.35507125
C-6	C-45	896	42.05	0.00	58.06	58.06	100.12	0	5006	5006	.11173646
X-33	C-46	576	115.78	0.00	34.89	34.89	150.67	0	3008	3008	.26157442
X-33	C-62	640	128.64	0.00	38.77	38.77	167.41	0	3342	3342	.26157442
X-33	C-72	640	128.64	0.00	38.77	38.77	167.41	0	3342	3342	.26157442
X-33	C-100	642	129.04	0.00	38.89	38.89	167.93	0	3353	3353	.26157442
TOTALS	23	135024	15890.45	1106.62	10224.39	11331.01	27221.46	95398	881413	976812	.20160460

PROTOTYPE BLDG.	BLDG. NO.	BLDG. SQ. FT.	ALL BLDG. AS IS FUEL OIL	BLDG. ANNUAL A/C ELEC.	MAAR ENERGY PER CENT LTG. ELEC.	CONSUMP. MOBIL. A/C+LTG. ELEC.	DATA D&E LINES TOTAL OIL+ELEC.	D AREA MBTU BLDG. A/C KWH/YR	ELEC. CONSUMP. LTG. KWH/YR	ENERGY TOTAL KWH R	TOTAL MBTU/ SQ.FT./YR
X-2	D-2	640	120.48	0.00	75.28	75.28	195.76	0	6490	6490	30588125
X-14	D-3	16763	2078.60	0.00	2408.66	2408.66	4487.26	0	207643	207643	.26768829
X-18	D-10	28146	5150.72	0.00	2527.71	2527.71	7678.43	0	217906	217906	.27280713
X-20	D-11	18900	3175.20	871.69	1311.72	2183.41	5358.61	75146	113079	188225	.28352434
X-33	D-21	244	49.04	0.00	14.78	14.78	63.82	0	1274	1274	.26155082
X-33	D-22	244	49.04	0.00	14.78	14.78	63.82	0	1274	1274	.26155082
X-33	D-33	11118	2234.70	0.00	673.48	673.48	2908.18	0	58059	58059	.26157442
X-33	D-34	11118	2234.70	0.00	673.48	673.48	2908.18	-	58059	58059	.26157442
X-41	D-41	10508	1744.33	116.89	1867.28	1984.17	3728.50	10077	160972	171049	.35482474
X-41	D-42	10109	1678.09	112.46	1796.38	1908.84	3586.93	9695	154860	164555	.35482521
T-1 AREA	D-44	4656	218.83	179.74	785.19	964.93	1183.76	15495	67689	83184	.25424493
X-33	D-61	640	128.64	0.00	38.77	38.77	167.41	0	3342	3342	.26157375
X-33	D-62	640	128.64	0.00	38.77	38.77	167.41	0	3342	3342	.26157375
X-33	D-63	1230	247.23	0.00	74.51	74.51	321.74	0	6423	6423	.26157463
X-33	E-1	300	60.30	0.00	18.18	18.18	78.48	0	1567	1567	.26159067
X-33	E-2	989	198.79	0.00	59.91	59.91	258.70	0	5165	5165	.26158140
X-33	E-3	120	24.12	0.00	7.27	7.27	31.39	0	627	627	.26161
X-4	E-4	5760	967.68	0.00	689.74	689.74	1657.42	0	59460	59460	.28774583
T-113	E-6	10116	536.15	317.31	1233.42	1550.72	2086.87	27354	106329	133683	.20629427
X-33	E-7	1023	205.62	0.00	61.97	61.97	267.59	0	5342	5342	.26157107
X-20	E-9	10400	1747.20	479.66	721.79	1201.45	2948.65	41350	62223	103573	.28352373
X-33	E-41	698	140.30	0.00	42.28	42.28	182.58	0	3645	3645	.26157880
TOTALS	22	143722	22997.92	2077.76	15060.05	17137.81	40135.73	179117	1298280	1477397	.27925944

			ALL BLDG, MAAP ENERGY CONSUMP. DATA								
			AS IS	100 PER CENT		MOBIL, F LINE & F AREA					
PROTOTYPE BLDG.	BLDG. NO.	BLDG. SQ. FT.	BLDG. ANNUAL FUEL OIL	A/C ELEC.	LTG. ELEC.	A/C+LTG. ELEC.	TOTAL OIL+ELEC. MBTU	BLDG. A/C KWH/YR	ELEC. CONSUMP. LTG. KWH/YR	ENERGY TOTAL KWH/YR	TOTAL MBTU/ SQ.FT./
X-33	F-1	54	10.25	0.00	3.09	3.09	13.34	0	266	266	.24695556
X-33	F-2	225	45.23	0.00	13.63	13.63	58.86	0	1175	1175	.2616
X-33	F-3	1369	275.17	0.00	82.93	82.93	358.10	0	7149	7149	.26157663
X-8	F-4	4080	820.08	0.00	247.15	247.15	1067.23	0	21306	21306	.26157588
X-33	F-5	54	10.25	0.00	3.09	3.09	13.34	0	266	266	.24695556
X-33	F-6	225	45.23	0.00	13.63	13.63	58.86	0	1175	1175	.2616
X-33	F-7	1283	257.88	0.00	77.72	77.72	335.60	0	6700	6700	.26157443
X-8	F-8	2440	490.44	0.00	147.81	147.81	638.25	0	12742	12742	.26157672
X-33	F-9	340	68.34	0.00	20.59	20.59	88.93	0	1775	1775	.26155882
X-18	F-11	22050	4035.15	0.00	1980.25	1980.25	6015.40	0	170711	170711	.27280715
X-33	F-12	1210	243.21	0.00	73.30	73.30	316.51	0	6319	6319	.26157884
X-33	F-17	120	24.12	0.00	7.27	7.27	31.39	0	627	627	.26161
X-33	F-18	720	144.72	0.00	43.62	43.62	188.34	0	3760	376	.26157778
X-20	F-19	12100	2032.80	558.08	839.77	1397.85	3430.65	48110	72394	120504	.28352450
X-21	F-20	7130	727.26	0.00	179.64	179.64	906.90	0	15486	15486	.12719461
T-1 AREA	F-50	3190	149.93	123.15	537.96	661.11	811.04	10616	46376	56992	.25424364
X-33	F-171	120	24.12	0.00	7.27	7.27	31.39	0	627	627	.26161
TOTALS	17	56710	9404.18	681.22	4278.71	4959.93	14364.11	58726	368854	427580	.25329057

			ALL BLDG.	MAAP ENERGY CONSUMP. DATA						
			AS IS	100 PER CENT		MOBIL. H&I LINES		I AREA		
PROTOTYPE BLDG.	BLDG. NO.	BLDG. SQ. FT.	BLDG. ANNUAL FUEL OIL	ENERGY CONSUMP. A/C ELEC.	LTG. ELEC.	A/C+LTG. ELEC.	MBTU TOTAL OIL+ELEC.	BLDG. ELEC. CONSUMP. A/C KWH/YR	ENERGY LTG. KWH/YR	TOTAL KWH/YR	TOTAL MBTU/ SQ FT./YR
X-33	H-6	120	24.12	0.00	7.27	7.27	31.39	0	627	627	.26161
X-20	H-12	13800	2318.40	636.48	957.75	1594.23	3912.63	54869	82565	137434	.28352423
X-33	H-81	4110	826.11	0.00	248.96	248.96	1075.07	0	214 2	21462	.26157401
X-33	H-91	120	24.12	0.00	7.27	7.27	31.39	0	627	627	.26161
X-33	H-92	120	24.12	0.00	7.27	7.27	31.39	0	627	627	.26161
X-33	H-102	54	10.25	0.00	3.09	3.09	13.34	0	266	266	.24695556
T-113	H-111	3760	139.12	161.55	320.93	482.48	621.60	13927	27666	41593	.16531883
T-113	H-115	9796	362.45	307.26	836.12	1143.38	1505.83	26488	72079	98567	.15371858
X-33	I-1	344	69.14	0.00	20.83	20.83	89.97	0	1796	1796	.26155116
X-33	I-2	180	36.18	0.00	10.90	10.90	47.08	0	940	940	.26157778
X-33	I-3	225	45.23	0.00	13.63	13.63	58.86	0	1175	1175	.2616
X-4	I-4	6304	1059.00	0.00	754.88	754.88	1813.88	0	65076	65076	.28773503
X-33	I-51	120	24.12	0.00	7.27	7.27	31.39	0	627	627	.26161
X-33	I-52	120	24.12	0.00	7.27	7.27	31.39	0	627	627	.26161
X-33	I-53	120	24.12	0.00	7.27	7.27	31.39	0	627	627	.26161
I-3	AREA I-3	20040	2228.90	0.00	2640.59	2640.59	4869.49	0	227637	227637	.24298848
I-3	AREA I-4	12150	1348.65	0.00	1600.94	1600.94	2949.59	0	138012	138012	.24276454
I-3	AREA I-5	7036	781.00	0.00	927.10	927.10	1708.10	0	79922	79922	.24276509
I-3	AREA I-6	4237	470.31	0.00	558.28	558.28	1028.59	0	48128	48128	.24276488
I-3	AREA I-7	1463	162.39	0.00	192.77	192.77	355.16	0	16618	16618	.24276063
I-3	AREA I-8	1567	173.94	0.00	206.48	206.48	380.42	0	17800	17800	.24276962
X-20	AREA I-23	5280	258.72	243.52	283.46	526.98	785.70	20993	24436	45429	.14880614
I-3	AREA I-40	9617	1067.49	0.00	1267.18	1267.18	2334.67	0	109240	109240	.24276531
I-3	AREA I-154	1296	143.86	0.00	170.76	170.76	314.62	0	14721	14721	.24276512
TOTALS	24	101979	11645.86	1348.81	11058.29	12407.10	24052.96	116277	953301	1069578	.23586194

ALL BLDG. MAAP ENERGY CONSUMP. DATA

AS IS 100 PER CENT MOBIL. J&K AREAS 0 LIFE

PROTOTYPE BLDG.	BLDG. NO.	BLDG. SQ. FT.	BLDG. ANNUAL MBTU FUEL OIL	BLDG. ANNUAL MBTU A/C ELEC.	ENERGY CONSUMP. LTG. ELEC.	ENERGY CONSUMP. A/C+LTG. ELEC.	MBTU TOTAL OIL+ELEC.	ELEC. CONSUMP. A/C KWH/YR	ELEC. CONSUMP. LTG. KWH/YR	ENERGY TOTAL KWH/YR	TOTAL MBTU/ SQ.FT./YR
X-21	J-2	10233	1043.77	0.00	257.82	257.82	1301.59	0	22226	22226	.12719550
X-21	J-3	2942	300.08	0.00	74.12	74.12	374.20	0	6390	6390	.12719375
X-21	J-4	6360	648.72	0.00	160.24	160.24	808.96	0	13814	13814	.12719535
X-21	J-5	16410	1673.82	0.00	413.46	413.46	2087.28	0	35643	35643	.12719554
X-21	J-8	1500	153.00	0.00	37.79	37.79	190.79	0	3258	3258	.1271952
I-3	J-9	10000	1110.00	0.00	1317.64	1317.64	2427.64	0	113590	113590	.2427644
X-20	J-10	6667	1117.26	307.49	462.68	770.17	1887.43	26508	39886	66394	.28310018
X-21	J-106	1928	196.66	0.00	48.58	48.58	245.24	0	4188	4188	.12719959
X-21	J-123	4100	418.20	0.00	103.30	103.30	521.50	0	8905	8905	.12719463
T-113	J-124	3002	111.07	94.16	256.23	350.39	461.46	8117	22089	30206	.15371739
C-6	J-129	6779	318.61	0.00	439.34	439.34	757.95	0	37874	37874	.11180829
C-6	J-130	28482	1336.12	0.00	1842.39	1842.39	3178.51	0	158827	158827	.11159726
T-113	J-135	2000	74.00	62.73	170.71	233.44	307.44	5408	14716	20124	.1537192
I-3	K-30	7495	831.95	0.00	987.58	987.58	1819.53	0	85136	85136	.24276552
I-3	K-312	10880	1207.68	0.00	1433.60	1433.60	2641.28	0	123586	123586	.24276449
I-3	K-315	5840	648.24	0.00	769.51	769.51	1417.75	0	66337	66337	.24276527
X-20	K-345	1200	201.60	55.34	83.29	138.63	340.23	4771	7180	11951	.28352633
X-12	O-1	3436	697.51	0.00	380.60	380.60	1078.11	0	32810	32810	.31376775
X-12	O-3	2912	591.14	0.00	322.56	322.56	913.70	0	27807	27807	.31377102
X-12	O-4	5427	1101.68	0.00	601.14	601.14	1702.82	0	51822	51822	.31376731
X-20	O-15	4155	696.30	191.64	288.35	479.98	1176.28	16520	24858	41378	.28310018
TOTALS	21	141748	14477.41	711.36	10450.92	11162.28	25639.69	61324	900941	962266	.18088220

ALL BLDG. MAAP ENERGY CONSUMP. DATA

AS IS 100. PER CENT MOBIL. Q AREA S AREA T AREA

PROTOTYPE BLDG.	BLDG. NO.	BLDG. SQ. FT.	BLDG. ANNUAL FUEL OIL	A/C ELEC.	LTG. ELEC.	A/C+LTG. ELEC.	ENERGY CONSUMP. MBTU TOTAL OIL+ELEC.	BLDG. A/C KWH/YR	ELEC. CONSUMP. LTG. KWH/YR	ENERGY TOTAL KWH/YR	TOTAL MBTU/ SQ.FT./YR
Q-23	Q-1TO19	38456	2384.27	0.00	1881.16	1881.16	4265.43	0	162169	162169	.11091716
Q-23	Q-20TO23	9600	595.20	0.00	469.60	469.60	1064.80	0	40483	40483	.11091696
Q-23	Q-24	2024	125.49	0.00	99.01	99.01	224.50	0	8535	8535	.11091700
Q-23	Q-25TO27	7200	446.40	0.00	352.20	352.20	798.60	0	30362	30362	.11091656
Q-23	Q-28TO32	10120	627.44	0.00	495.04	495.04	1122.48	0	42676	42676	.11091715
X-21	S-31	7650	780.30	0.00	192.75	192.75	973.05	0	16616	16616	.12719550
X-20	S-32	7650	1285.20	352.83	530.93	883.76	2168.96	30416	45770	76186	.28352387
T-1	T-1	50481	2370.20	1948.75	1512.98	10461.74	12831.94	167996	733878	901874	25419343
T-1	T-2	6832	321.10	263.75	1152.16	1415.91	1737.01	22737	99324	122061	.25424584
T-1	T-10	13398	629.71	517.23	2259.45	2776.68	3406.39	44589	194780	239369	.25424619
T-113	T-113	12184	644.70	382.19	1485.57	1867.75	2512.45	32947	128066	161013	.20620903
T-114	T-114	5760	113.88	273.90	1185.98	1459.88	1573.68	23612	102240	125852	.27320889
TOTALS	39	171355	10323.81	3738.65	18616.83	22355.47	32679.28	32[illegible]297	160485[illegible]	1927196	.19071100

MAAP ENERGY CONSUMP. DATA

ALL BLDG. ANNUAL ENERGY CONSUMP. MBTU

AS IS 100 PER CENT MOBIL. 367 LINES

PROTOTYPE BLDG.	BLDG. NO.	BLDG. SQ. FT.	BLDG. FUEL OIL	BLDG. A/C ELEC.	BLDG. LTG. ELEC.	BLDG. A/C+LTG. ELEC.	BLDG. TOTAL OIL+ELEC.	ELEC. CONSUMP. A/C KWH/YR	ELEC. CONSUMP. LTG. KWH/YR	ENERGY TOTAL KWH/YR	TOTAL MBTU/ SQ.FT./YR
T-113	V-20	3850	142.45	120.76	328.60	449.36	591.81	10410	28328	38738	.15371709
T-113	V-21	7750	286.75	243.09	661.49	904.58	1191.33	20956	57025	77981	.15371995
C-6	V-22	3050	143.35	0.00	197.66	197.66	341.01	0	17040	17040	.11180787
C-6	V-23	3050	143.35	0.00	197.66	197.66	341.01	0	17040	17040	.11180787
C-6	V-24	3050	143.35	0.00	197.66	197.66	341.01	0	17040	17040	.11180787
C-6	V-25	3050	143.35	0.00	197.66	197.66	341.01	0	17040	17040	.11180787
C-6	V-26	3050	143.35	0.00	197.66	197.66	341.01	0	17040	17040	.11180787
X-21	V-101	1456	148.51	0.00	36.68	36.68	185.19	0	3162	3162	.12719038
X-21	V-102	1456	148.51	0.00	36.68	36.68	185.19	0	3162	3162	.12719038
X-21	V-103	1456	148.51	0.00	36.68	36.68	185.19	0	3162	3162	.12719038
X-21	V-104	1456	148.51	0.00	36.68	36.68	185.19	0	3162	3162	.12719038
X-21	V-201	1456	148.51	0.00	36.68	36.68	185.19	0	3162	3162	.12719038
X-21	V-202	1456	148.51	0.00	36.68	36.68	185.19	0	3162	3162	.12719038
X-21	V-203	1456	148.51	0.00	36.68	36.68	185.19	0	3162	3162	.12719038
X-21	V-204	1456	148.51	0.00	36.68	36.68	185.19	0	3162	3162	.12719038
X-33	Z-2	989	198.79	0.00	59.91	59.91	258.70	0	5165	5165	.26158140
X-4	Z-4	3297	553.90	0.00	394.81	394.81	948.71	0	34035	34035	.28774826
X-33	Z-6	1210	243.21	0.00	73.30	73.30	316.51	0	6319	6319	.26157884
T-113	Z-8	17050	903.65	534.79	2078.87	2613.67	3517.32	46103	179213	225316	.20629417
X-20	Z-10	10450	1755.60	481.97	725.26	1207.22	2962.82	41549	62522	104071	.28352379
X-21	Z-11	9920	1011.84	0.00	249.93	249.93	1261.77	0	21546	21546	.12719492
TOTALS	21	81414	7001.02	1380.61	5853.93	7234.54	14235.56	119018	504649	623667	.17485392

			ALL BLDG. MAAR ENERGY CONSUMP. DATA									
			AS IS	100	PER CENT	MOBIL.		X LINE				
PROTOTYPE BLDG.	BLDG. NO.	BLDG. SQ. FT.	BLDG. ANNUAL FUEL OIL	A/C ELEC.	LTG. ELEC.	A/C+LTG. ELEC.	TOTAL OIL+ELEC.	MBTU BLDG. A/C KWH/YR	ELEC. CONSUMP. LTG. KWH/YR	ENERGY TOTAL KWH/YR	TOTAL MBTU/ SQ.FT./YR
X-2	X-2	2400	451.80	0.00	282.32	282.32	734.12	0	24338	24338	.30588367
X-4	X-4	4830	810.40	0.00	578.35	578.35	1388.75	0	49858	49858	.28752646
X-33	X-7	494	99.29	0.00	29.93	29.93	129.22	0	2580	2580	.26157490
X-8	X-8	6550	1094.50	0.00	748.36	748.36	1842.86	0	64514	64514	.28135304
X-33	X-11	120	24.12	0.00	7.27	7.27	31.39	0	627	627	.26161
X-12	X-12	7696	1559.20	0.00	852.44	852.44	2411.64	0	73486	73486	.31336247
X-14	X-14	20050	2476.90	0.00	2881.00	2881.00	5357.90	0	248362	248362	.26722689
X-33	X-16	640	128.64	0.00	38.77	38.77	167.41	0	3342	3342	.26157375
X-33	X-17	120	24.12	0.00	7.27	7.27	31.39	0	627	627	.26161
X-18	X-18	15000	3107.30	0.00	1526.71	1526.71	4634.01	0	131613	131613	.30893405
X-33	X-19	640	128.64	0.00	38.77	38.77	167.41	0	3342	3342	.26157375
X-20	X-20	15500	2597.50	714.88	1075.67	1790.55	4388.05	61628	92730	154358	.28310018
X-21	X-21	13700	1397.10	0.00	345.23	345.23	1742.33	0	29761	29761	.12717720
X-27	X-27	7050	1069.00	0.00	643.70	643.70	1712.70	0	55491	55491	.24293555
X-33	X-28	120	24.12	0.00	7.27	7.27	31.39	0	627	627	.26161
X-33	X-33	11118	2234.70	0.00	673.48	673.48	2908.18	0	58059	58059	.26157442
X-33	X-34	11118	2234.70	0.00	673.48	673.48	2908.18	0	58059	58059	.26157442
X-41	X-41	17408	2894.00	193.73	3093.35	3287.08	6181.08	16701	266668	283369	.35507125
X-33	X-61	651	130.85	0.00	39.44	39.44	170.29	0	3400	3400	.26158218
X-33	X-71	651	130.85	0.00	39.44	39.44	170.29	0	3400	3400	.26158218
TOTALS	20	135856	22617.73	908.62	13582.25	14490.87	37108.60	78329	1170884	1249213	.27314657

				PROTOTYPE	BLDG.	MAAP ENERGY	CONSUMP.	DATA				
				AS IS	15	PER CENT	MOBIL.					
GROUP NO.	BLDG. NO.	BLDG. DESCRIP.	BLDG. SQ. FT.	BLDG. ANNUAL ENERGY MBTU FUEL OIL	A/C ELEC.	LTG. ELEC.	CONSUMP. TOTAL OIL+ELEC.	BLDG. KW PEAK	ELEC. A/C KWH/YR	ENERGY LTG. KWH/YR	CONSUMP. TOTAL KWH/YR	TOTAL MBTU/ SQ.FT./YR
A-I-E	T-1	ADMIN	50481	1398.42	1520.03	4256.49	7174.94	264.50	131037	366939	901874	.14213149
A-I-E	T-114	COMPUTER	5760	113.80	273.90	1185.98	1573.68	38.00	23612	102240	125852	.27320089
A-I-F		OFFICE										
CH-I-F	X-20	CHG HOUSE	15500	1532.53	650.54	451.79	2634.85	72.00	56081	38947	154358	.16999031
D-I-F		CAFE										
CH-I-F	X-21	CHG HOUSE BOILER	13704	824.29	0.00	145.00	969.29	18.50	0	12500	29761	.07075102
D-I-E	T-113	CAFE	12184	380.37	347.79	742.78	1470.95	49.20	29982*	64033	161013	.2072776
FH-I-E	Q-23	FAMILY HOUSING	2400	49.30	0.00	88.04	137.35	1.50	0	7590	10120	.0572275
M-I-E	I-3	VEHICLE REPAIR	20040	1315.05	0.00	1109.05	2424.10	37.50	0	95608	227627	.12096326
M-I-F	C-6	PRODUC.	9814	271.75	0.00	267.11	538.87	9.00	0	23027	54826	.05490801
M-I-F	X-4	PELLETIZ.	4830	478.14	0.00	323.87	802.01	11.60	0	27920	49858	.16604720
M-I-F	X-8	ASSEMBLY	6550	645.76	0.00	419.08	1064.84	15.00	0	36128	64514	.16257096
M-I-F	X-12	ASSEMBLY	7696	919.93	0.00	477.36	1397.29	17.10	0	41152	73[illegible]	.18156071
M-I-F	X-14	ASSEMBLY	20050	1461.37	0.00	1210.02	2671.39	40.90	0	104312	248[illegible]	.13[illegible]
M-I-F	X-18	ASSEMBLY	17000	1833.31	0.00	854.95	2688.26	30.60	0	73703	131613	.1581330
M-I-F	X-27	ASSEMBLY	7050	630.71	0.00	360.47	991.18	12.90	0	31075	55491	.14059291
M-I-F	X-41	MELT POUR	17408	1707.46	87.17	1299.21	3093.85	91.60	7515	112001	266668	.17772551
W-I-F	X-2	STORAGE	2400	266.56	0.00	118.58	385.14	4.00	0	10222	24338	.16047383
W-I-F	X-33	INERT STORAGE	11118	1318.47	0.00	282.87	1601.34	9.60	0	24385	58059	.14403121

ALL BLDG, MAAR ENERGY CONSUMP. DATA

AS IS 15 PER CENT MOBIL, B LINE

PROTOTYPE BLDG.	BLDG. NO.	BLDG. SQ. FT.	BLDG. ANNUAL FUEL OIL	BLDG. ANNUAL A/C ELEC.	ENERGY CONSUMP. LTG. ELEC.	ENERGY CONSUMP. A/C+LTG. ELEC.	MBTU TOTAL OIL+ELEC.	BLDG. ELEC. CONSUMP. A/C KWH/YR	BLDG. ELEC. CONSUMP. LTG. KWH/YR	ENERGY TOTAL KWH/YR	TOTAL MBTU/ SQ.FT./YR
X-12	B-12	3296	393.98	0.00	204.44	204.44	598.42	0	17624	17624	.18155974
X-14	B-14	23050	1680.03	0.00	1391.07	1391.07	3071.10	0	119920	119920	.13323648
X-33	B-15	54	6.40	0.00	1.37	1.37	7.77	0	118	118	.14393692
X-33	B-16	640	75.90	0.00	16.29	16.29	92.18	0	1404	1404	.14403627
X-18	B-18	15996	1725.04	0.00	804.46	804.46	2529.50	0	69350	69350	.15813309
X-20	B-20	15500	1532.53	650.54	451.79	1102.32	2634.85	56081	38947	95028	.16999063
X-21	B-21	14050	845.35	0.00	148.70	148.70	994.05	0	12819	12819	.07075081
TOTALS	7	72586	6259.23	650.54	3018.11	3668.65	9927.88	56081	260182	314263	.13677401

ALL BLDG, MAAP ENERGY CONSUMP. DATA

AS IS 15 PER CENT MOBIL. D LINE D AREA

PROTOTYPE BLDG.	BLDG. NO.	BLDG. SQ. FT.	ALL BLDG, FUEL OIL	BLDG, ANNUAL A/C ELEC,	ENERGY LTG. ELEC,	CONSUMP. A/C+LTG. ELEC.	MBTU TOTAL OIL+ELEC.	BLDG. A/C KWH/YR	ELEC. CONSUMP. LTG. KWH/YR	ENERGY TOTAL KWH/YR	TOTAL MBTU/ SQ.FT./YR
X-2	D-2	640	71.00	0.00	31.62	31.62	102.70	0	2726	2726	.16047300
X-14	D-3	16763	1221.79	0.00	1011.65	1011.65	2233.44	0	87211	87211	.13323637
X-20	D-11	18900	1868.70	793.24	550.89	1344.13	3212.82	68383	47490	115873	.16999063
T-1 AREA	D-44	4656	128.98	140.20	392.59	532.78	661.76	12086	33844	45930	.14213153
TOTALS	4	40959	3290.55	933.44	1986.74	2920.18	6210.73	80469	171271	251739	.15163288

MAAP ALL BLDG. ENERGY CONSUMP. DATA

AS IS 15 PER CENT MOBIL. F LINE & F AREA

PROTOTYPE BLDG.	BLDG. NO.	BLDG. SQ. FT.	BLDG. ANNUAL FUEL OIL	BLDG. ANNUAL A/C ELEC.	ENERGY LTG. ELEC.	CONSUMP. A/C+LTG. ELEC.	MBTU TOTAL OIL+ELEC.	BLDG. A/C KWH/YR	ELEC. CONSUMP. LTG. KWH/YR	ENERGY TOTAL KWH/YR	TOTAL MBTU/ SQ.FT./YR
X-33	F-1	54	6.40	0.00	1.37	1.37	7.78	0	118	118	.14403094
X-33	F-2	225	26.68	0.00	5.72	5.72	32.41	0	493	493	.14403094
X-33	F-3	1369	162.35	0.00	34.83	34.83	197.18	0	3003	3003	.14403094
X-8	F-4	4080	402.24	0.00	261.05	261.05	663.29	0	22504	22504	.16257173
X-33	F-5	54	6.40	0.00	1.37	1.37	7.78	0	118	118	.14403094
X-33	F-6	225	26.68	0.00	5.72	5.72	32.41	0	493	493	.14403094
X-33	F-7	1283	152.15	0.00	32.64	32.64	184.79	0	2814	2814	.14403094
X-8	F-8	2440	240.56	0.00	156.12	156.12	396.68	0	13458	13458	.16257173
X-33	F-9	340	40.32	0.00	8.65	8.65	48.97	0	746	746	.14403094
X-18	F-11	22050	2377.91	0.00	1108.93	1108.93	3486.84	0	95597	95597	.15813322
X-33	F-12	1210	143.49	0.00	30.79	30.79	174.28	0	2654	2654	.14403094
X-33	F-17	120	14.23	0.00	3.05	3.05	17.28	0	263	263	.14401295
X-33	F-18	720	85.38	0.00	18.32	18.32	103.70	0	1579	1579	.14403094
X-20	F-19	12100	1196.36	507.84	352.68	860.52	2056.89	43779	30404	74183	.16999063
X-21	F-20	7130	428.99	0.00	75.46	75.46	504.46	0	6505	6505	.07075109
T-1	AREA F-50	3190	88.37	96.05	268.98	365.03	453.40	8281	23188	31468	.14213153
X-33	F-171	120	14.23	0.00	3.05	3.05	17.28	0	263	263	.14403094
TOTALS	17	56710	5412.76	603.89	2368.75	2972.64	8385.40	52060	204202	256262	.14786460

			ALL BLDG.	MAAR ENERGY CONSUMP. DATA						
			AS IS	IS PER CENT	MOBIL. H&I LINES		I AREA			
PROTOTYPE BLDG.	BLDG. NO.	BLDG. SQ. FT.	BLDG. ANNUAL FUEL OIL	ENERGY A/C ELEC.	LTG. ELEC.	CONSUMP. A/C+LTG. ELEC.	MBTU TOTAL OIL+ELEC.	BLDG. A/C KWH/YR	ELEC. CONSUMP. LTG. KWH/YR	ENERGY TOTAL KWH/YR	TOTAL MBTU/ SQ.FT./YR
X-33	H-6	120	14.23	0.00	3.05	3.05	17.28	0	263	263	.14403094
X-20	H-12	13800	1364.45	579.19	402.23	981.42	2345.87	49930	34675	84606	.16999063
X-33	H-81	4110	487.40	0.00	104.57	104.57	591.97	0	9014	9014	.14403094
X-33	H-91	120	14.23	0.00	3.05	3.05	17.28	0	263	263	.14403094
X-33	H-92	120	14.23	0.00	3.05	3.05	17.28	0	263	263	.14403094
X-33	H-102	54	6.40	0.00	1.37	1.37	7.78	0	118	118	.14403094
T-113	H-111	3760	117.38	107.33	229.22	336.55	453.94	9252	19761	29013	.12072751
T-113	H-115	9796	305.82	279.63	597.20	876.83	1182.65	24106	51483	75589	.12072751
X-33	I-1	344	40.79	0.00	8.75	8.75	49.55	0	754	754	.14403094
X-33	I-2	180	21.35	0.00	4.58	4.58	25.93	0	395	395	.14403094
X-33	I-3	225	26.68	0.00	5.72	5.72	32.41	0	493	493	.14403094
X-4	I-4	6304	624.06	0.00	422.71	422.71	1046.77	0	36441	36441	.16604803
X-33	I-51	120	14.23	0.00	3.05	3.05	17.28	0	263	263	.14403094
X-33	I-52	120	14.23	0.00	3.05	3.05	17.28	0	263	263	.14401211
X-33	I-53	120	14.23	0.00	3.05	3.05	17.28	0	263	263	.14401211
I-3	AREA I-3	20040	1315.05	0.00	1109.05	1109.05	2424.10	0	95608	95608	.12096321
I-3	AREA I-4	12150	797.30	0.00	672.40	672.40	1469.70	0	57966	57966	.12096321
I-3	AREA I-5	7036	461.71	0.00	389.39	389.39	851.10	0	33568	33568	.12096321
I-3	AREA I-6	4237	278.04	0.00	234.48	234.48	512.52	0	20214	20214	.12096321
I-3	AREA I-7	1463	96.00	0.00	80.97	80.97	176.97	0	6980	6980	.12096321
I-3	AREA I-8	1567	102.83	0.00	86.72	86.72	189.55	0	7476	7476	.12096321
X-20	AREA I-23	5280	522.05	221.60	153.90	375.50	897.55	19104	13267	32371	.16999063
I-3	AREA I-40	9617	631.08	0.00	532.22	532.22	1163.30	0	45881	45881	.12096321
I-3	AREA I-154	1296	85.05	0.00	71.72	71.72	156.77	0	6183	6183	.12096321
TOTALS	24	101979	7368.82	1187.75	5125.54	6313.29	13682.11	102392	441857	544249	.13416592

			ALL BLDG.	MAAP	CONSUMP. DATA					
			AS IS	IS PER CENT	MOBIL, J&K AREAS		Q LINE			
PROTOTYPE BLDG.	BLDG. NO.	BLDG. SQ. FT.	BLDG. ANNUAL FUEL OIL	ENERGY A/C ELEC,	LTG. ELEC,	CONSUMP. A/C+LTG, ELEC.	MBTU TOTAL OIL+ELEC.	BLDG. A/C KWH/YR	ELEC. CONSUMP. LTG. KWH/YR	ENERGY TOTAL KWH/YR	TOT. MBTU/ SQ.FT./YR
X-21	J-2	10233	615.69	0.00	108.31	108.31	724.00	0	9337	9337	.07075109
X-21	J-3	2942	177.01	0.00	31.14	31.14	208.15	0	2684	2684	.07075109
X-21	J-4	6368	382.66	0.00	67.31	67.31	449.98	0	5803	5803	.07075109
X-21	J-5	16410	987.34	0.00	173.68	173.68	1161.03	0	14973	14973	.07075109
I-3	J-8	1500	90.25	0.00	15.88	15.88	106.13	0	1369	1369	.07075109
X-20	J-9	10000	656.21	0.00	553.42	553.42	1209.63	0	47709	47709	.12096321
X-21	J-10	6667	659.19	279.82	194.33	474.14	1133.33	24122	16752	40874	.16999063
X-21	J-106	1928	116.00	0.00	20.41	20.41	136.41	0	1759	1759	.07075109
T-113	J-123	4100	246.69	0.00	43.39	43.39	290.08	0	3741	3741	.07075109
C-6	J-124	3002	93.72	94.16	256.23	350.39	444.11	8117	22089	30206	.14793753
C-6	J-129	6779	187.71	0.00	184.51	184.51	372.22	0	15906	15906	.05490760
T-113	J-130	28482	788.67	0.00	775.21	775.21	1563.88	0	66829	66829	.05490760
I-3	J-135	2000	62.44	57.09	121.93	179.02	241.46	4922	10511	15433	.12072751
I-3	K-301	7495	491.83	0.00	414.79	414.79	906.62	0	35758	35758	.12096321
I-3	K-312	10880	713.96	0.00	602.12	602.12	1316.08	0	51907	51907	.12096321
X-20	K-315	5848	383.23	0.00	323.20	323.20	706.43	0	27862	27862	.12096321
X-12	K-345	1200	118.65	50.36	34.98	85.34	203.99	4342	3015	7357	.16999063
X-12	0-1	3436	410.72	0.00	213.13	213.13	623.84	0	18373	18373	.18156097
X-12	0-3	2912	348.08	0.00	180.62	180.62	528.71	0	15571	15571	.18156097
X-12	0-4	5427	648.71	0.00	336.62	336.62	985.33	0	29019	29019	.18156097
X-20	0-15	4155	410.82	174.39	121.11	295.49	706.31	15033	10440	25474	.16999063
TOTALS	21	141748	8589.57	655.81	4772.30	5428.12	14017.69	56536	411405	467941	.09889160

ALL BLDG, MAAP CONSUMP, DATA

AB IB 15 PER CENT MOBIL, Q AREA S AREA T AREA

PROTOTYPE BLDG,	BLDG. NO,	BLDG. SQ. FT.	BLDG, ANNUAL FUEL OIL	ENERGY A/C ELEC,	CONSUMP, LTG. ELEC.	A/C+LTG. ELEC,	MBTU TOTAL OIL+ELEC.	BLDG. A/C KWH/YR	ELEC. CONSUMP. LTG. KWH/YR	ENERGY TOTAL KWH/YR	TOTAL MBTU/ SQ.FT./YR
Q-23	Q-1TO19	38456	769.95	0.00	1410.76	1410.76	2200.71	0	121617	121617	.05722667
Q-23	Q-20TO23	9600	197.20	0.00	352.18	352.18	549.38	0	30360	30360	.05722667
Q-23	Q-24	2024	41.58	0.00	74.25	74.25	115.83	0	6401	6401	.05722667
Q-23	Q-25TO27	7200	147.90	0.00	264.13	264.13	412.03	0	22770	22770	.05722667
Q-23	Q-28TO32	10120	207.88	0.00	371.25	371.25	579.13	0	32005	32005	.05722667
X-21	S-31	7650	460.28	0.00	80.97	80.97	541.25	0	6980	6980	.07075109
X-20	S-32	7650	756.38	321.07	222.98	544.05	1300.43	27679	19222	[illegible]901	.16999063
T-1	T-1	50481	1398.42	1520.03	4256.49	5776.52	7174.94	131037	366939	497976	.14213153
T-1	T-2	6832	189.26	205.72	576.07	781.78	971.04	17734	49661	67395	.14213153
T-1	T-10	13398	371.15	403.43	1129.70	1533.13	1904.28	34778	97388	132166	.14213153
T-113	T-113	12184	380.37	347.79	742.78	1090.57	1470.94	29982	64033	94015	.12072751
T-114	T-114	5760	113.80	273.90	1185.98	1459.88	1573.68	23612	102240	125852	.27320889
TOTALS	39	171355	5054.16	3071.94	10667.54	13739.48	18793.64	264822	919616	1184438	.10967664

MAAR BLDG. CONSUMP. DATA

ALL AS IS 15 PER CENT MOBIL. X LINE

PROTOTYPE BLDG.	BLDG. NO.	BLDG. SQ. FT.	BLDG. ANNUAL FUEL OIL	A/C ELEC.	LTG. ELEC.	A/C+LTG. ELEC.	ENERGY CONSUMP. TOTAL OIL+ELEC.	MBTU BLDG. A/C KWH/YR	ELEC. CONSUMP. LTG. KWH/YR	ENERGY TOTAL KWH/YR	TOTAL MBTU/ SQ.FT. YR
X-4	X-4	4830	478.14	0.00	323.88	323.88	802.01	0	27920	27920	.16604[illegible]
X-33	X-7	494	58.50	0.00	12.57	12.57	71.15	0	1084	1084	.14403006
X-8	X-8	6550	645.76	0.00	419.08	419.08	1064.84	0	36128	36128	.16257068
X-12	X-12	7696	919.93	0.00	477.37	477.37	1397.29	0	41152	41152	.18156095
X-14	X-14	20050	1461.37	0.00	1210.02	1210.02	2671.39	0	104312	104312	.13323644
X-33	X-17	120	14.23	0.00	3.05	3.05	17.29		263	263	.1440462
X-18	X-18	15000	1833.31	0.00	854.96	854.96	2688.27	0	73703	73703	.17921767
X-33	X-19	640	75.90	0.00	16.28	16.28	92.18	0	1404	1404	.14403098
X-20	X-20	15500	1532.53	650.55	451.78	1102.33	2634.85	56081	38947	95028	.16999037
X-21	X-21	13700	824.29	0.00	145.00	145.00	969.28	0	12500	12500	.07075070
X-27	X-27	7050	630.71	0.00	360.47	360.47	991.18	1	31075	31075	.14059284
X-41	X-41	17408	1707.46	87.18	1299.21	1386.39	3093.85	7515	112001	119516	.17772501
TOTALS	12	109038	10182.19	737.72	5573.66	6311.39	16493.58	63597	481[illegible]88	544[illegible]85	.15126449

ALL BLDG. MAAR ENERGY CONSUMP. DATA

AS IS IS PER CENT MOBIL. V&Z LIMES

PROTOTYPE BLDG.	BLDG. NO.	BLDG. SQ. FT.	BLDG. ANNUAL FUEL OIL	A/C ELEC.	LTG. ELEC.	A/C+LTG. ELEC.	TOTAL OIL+ELEC.	MBTU BLDG. A/C KWH/YR	ELEC. CONSUMP. LTG. KWH/YR	ENERGY TOTAL KWH/YR	TOTAL MBTU/ SQ.FT./YR
T-113	V-20	3850	120.19	109.90	234.71	344.61	464.80	9474	20234	29708	.12072751
T-113	V-21	7750	241.95	221.22	472.47	693.69	935.64	19071	40730	59801	.12072751
C-6	V-22	3050	84.45	0.00	83.01	83.01	167.47	0	7156	7156	.05490760
C-6	V-23	3050	84.45	0.00	83.01	83.01	167.46	0	7156	7156	.05490479
C-6	V-24	3050	84.45	0.00	83.01	83.01	167.46	0	7156	7156	.05490479
C-6	V-25	3050	84.45	0.00	83.01	83.01	167.46	0	7156	7156	.05490479
C-6	V-26	3050	84.45	0.00	83.01	83.01	167.46	0	7156	7156	.05490479
X-21	V-101	1456	87.60	0.00	15.41	15.41	103.01	0	1328	1328	.07075109
X-21	V-102	1456	87.60	0.00	15.40	15.40	103.00	0	1328	1328	.07074505
X-21	V-103	1456	87.60	0.00	15.40	15.40	103.00	0	1328	1328	.07074505
X-21	V-104	1456	87.60	0.00	15.40	15.40	103.00	0	1328	1328	.07074505
X-21	V-201	1456	87.60	0.00	15.40	15.40	103.00	0	1328	1328	.07074505
X-21	V-202	1456	87.60	0.00	15.40	15.40	103.00	0	1328	1328	.07074505
X-21	V-203	1456	87.60	0.00	15.40	15.40	103.00	0	1328	1328	.07074505
X-21	V-204	1456	87.60	0.00	15.40	15.40	103.00	0	1328	1328	.07074505
X-33	Z-2	989	117.28	0.00	25.16	25.16	142.45	0	2169	2169	.14403094
X-4	Z-4	3297	326.38	0.00	221.08	221.08	547.46	0	19058	19058	.16604803
X-33	Z-6	1210	143.49	0.00	30.79	30.79	174.28	0	2654	2654	.14403094
T-113	Z-8	17050	532.28	534.79	1039.43	1574.23	2106.51	46103	89606	135709	.12354886
X-20	Z-10	10450	1033.22	481.97	304.59	786.56	1819.78	41549	26258	67807	.17414171
X-21	Z-11	9920	596.86	0.00	104.99	104.99	701.85	0	9051	9051	.07075109
TOTALS	21	81414	4234.72	1347.88	2971.52	4319.40	8554.12	116197	256165	372362	.10506936

B-3 ECAM SAVINGS

The first table shows energy savings for the various ECAM project groupings of buildings.

The second table shows the results of computer run composite project energy savings, when performed on insulated buildings, with and without temperature controls added.

E	C	A	M			G	A	V	I	N	G	S
LINE OR AREA	ROOF INSULATION			WALL INSULATION			REDUCED FENESTRATION			ATC MODIFICATIONS		
	FUEL MBTU	KWH	TOTAL MBTU	FUEL MBTU	KWH	TOTAL MBTU	FUEL MBTU	KWH	TOTAL MBTU	FUEL MBTU	KWH	TOTAL MBTU
B - LINE	3548	9283	3656	1923	8590	2023	531	1580	549	1490	16895	1686
X - LINE	3544	0	3544	2369	8591	2469	669	1581	687	2449	16880	2644
ALL OTHER LINES & AREAS												
D - LINE*	1933	11320	2064	1052	10475	1173	175	1927	197	810	20601	1049
D - AREA	0	0	0	0	0	0	0	0	0	34	1	34
F - AREA	0	0	0	0	0	0	0	0	0	23	1	23
H - LINE*	854	8265	950	635	7648	724	69	1407	86	534	22456	794
I - AREA	0	0	0	0	0	0	0	0	0	1584	5756	1651
J - AREA*	282	0	282	423	0	423	136	0	136	1024	10733	1148
K - AREA	0	0	0	0	0	0	0	0	0	889	0	889
O - LINE*	1502	2489	1531	331	2303	358	62	424	67	428	4529	481
Q - AREA	0	0	0	0	0	0	0	0	0	439	0	439
T - AREA	0	0	0	0	0	0	0	0	0	618	6677	695
V - LINE	0	0	0	0	0	0	0	0	0	202	6345	275
TOTAL OTHER	4571	22074	4827	2441	20426	2678	442	3758	486	6585	77099	7478
FUEL OIL	0			0			0			3789		
COAL	4571			2441			442			2796		
TOTAL ALL PROJECTS	11663	31357	12027	6733	37607	7170	1642	6919	1722	10524	110874	11808
FUEL OIL	7092			4292			1200			7728		
COAL	4571			2441			442			2796		

COAL FUEL SOURCE IS INDICATED BY AN * - ALL OTHER LINES & AREAS HAVE FUEL OIL AS A HEATING SOURCE

ECAM SAVINGS

LINE OR AREA	COMPOSITE SAVING - ROOF, GLASS, WALL, ATC MODIFIC			SAVINGS ATTRIBUTABLE TO GLASS, ROOF, WALL MOD ONLY		
	FUEL MBTU	KWH	TOTAL MBTU	FUEL MBTU	KWH	TOTAL MBTU
B - LINE	4720	22899	4986	3230	6004	3300
X - LINE	5690	17043	5887	3241	163	3243
ALL OTHER LINES & AREAS						
D - LINE*	2501	27923	2824	1691	7322	1775
D - AREA	34	1	34	0	0	0
F - AREA	23	1	23	0	0	0
H - LINE*	1318	25059	1609	784	2603	815
I - AREA	1584	5756	1651	0	0	0
J - AREA*	1175	6762	1253	151	0	105
K - AREA	889	0	889	0	0	0
O - LINE*	1463	6139	1535	1035	1610	1054
Q - AREA	439	0	439	0	0	0
T - AREA	618	6677	695	0	0	0
V - LINE	202	6345	275	0	0	0
TOTAL OTHER	10247	84664	11228	3662	11536	3750
FUEL OIL	3789			0		
COAL	6458			3662		
TOTAL ALL PROJECTS	20656	124606	22101	10132	17703	10293
FUEL OIL	14198			6471		
COAL	6458			3662		

COAL FUEL SOURCE IS INDICATED BY AN * - ALL OTHER LINES & AREAS HAVE FUEL OIL AS A HEATING SOURCE

APPENDIX C

LIST OF REPORTS

LIST OF REPORTS

ENERGY USE SURVEY

Narrative - Volume I, Section 3

Supporting Data - Volume II and III

ENERGY MONITORING AND CONTROL SYSTEMS

Narrative - Volume I, Section 4

Supporting Data - Volume II

BIOMASS SURVEY

Narrative - Volume I, Section 5

Supporting Data - Volume III

BASEWIDE ENERGY PLAN RECOMMENDATIONS

Volume I, Section 6

ECAM PROJECTS BROCHURES

Volume I, Section 7